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A Monitoring and Evaluation Plan for Programs at Urban Health Initiative, Emory University that aids in Reducing Cancer Mortality and Morbidity in People of Atlanta

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A Monitoring and Evaluation Plan for Programs at Urban Health Initiative, Emory University that aids in Reducing Cancer Mortality and Morbidity in People of Atlanta

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An abstract of
A thesis submitted to the Faculty of the
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Abstract

A Monitoring and Evaluation Plan for Programs at Urban Health Initiative, Emory University that aids in reducing cancer mortality and morbidity in people of Atlanta

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Background: Cancer is a major public health problem in the United States, as it is the second leading cause of death globally. The prevalence of cancer among low-resourced communities of Atlantan metropolitan regions and Georgia is a growing public health concern. The public and private hospitals provide cancer treatment, however, the cost of treatment and associated disparities, screening awareness, and risk factors associated with cancer, impacts the service utilization, and adds to the burden. Emory Urban Health Initiative identified three potential programs to solve this problem through Grady Hospital System and other partner organizations. Currently, three programs under UHI are working intending to improve cancer awareness, improve access to low-cost screening, and ensure timely treatment. These three programs are — *Tobacco Use Prevention & Cessation, Cancer Detecting Dogs, and Dental Diversion.*

Methods: The objective of this thesis was to examine program inputs and resources and connect them to activities, outputs, and outcomes. The program indicators identified were specific, measurable, realistic, and commonly utilized in data collection and analysis for cancer screening and prevention programs. This was done to identify areas of research, monitoring, and evaluation for improvement in programs and processes, to demonstrate reach and impact. The existing gaps in the programs were also identified through a comprehensive literature review.

Results: Three logic models and corresponding monitoring and evaluation frameworks were developed for each program to standardize and improve future monitoring and evaluation efforts. The logic models and frameworks identified indicators crucial for demonstrating program impacts that currently are not being monitored. UHI collects program data and utilizes surveys tools and focus groups for evaluations. However, this M&E framework will provide a foundation to further investigate gaps and revise program needs and goals.

Conclusions: Program-specific recommendations were made to use the developed monitoring and evaluation framework; indicators were selected based on expected program impacts and formative research conducted by UHI. Prioritization of activities was recommended for engaging volunteers, enhancing partner collaborations, funding, and advertising programs. This thesis serves as a comprehensive resource for UHI as it continues with the programs aiming to reduce cancer mortality and morbidity.

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Chapter 1

Introduction

Problem Statement

The growing burden of cancer is a public health problem of international concern. Like any other public health concern, cancer prevalence, mortality, and morbidity have been affected by factors that lead to health inequities worldwide. While there have been tremendous efforts to improve cancer treatment modalities, technological advancement, and a shift in focus toward reducing the burden of cancer, not all populations have equal access to these facilities. Unfortunately, many Americans can't make healthy choices because of factors such as geography, race or ethnicity, educational status, physical or mental abilities, and income levels (CDC, 2021). Some of the key social determinants of health that are likely to decide if a person is at risk of getting cancer at any time in life are — cigarette smoking, access to affordable screening methods, and unhealthy food choices. The interventions like early screening, tobacco cessation programs, and awareness about risk factors and lifestyle changes have been associated with a reduction in the risk of getting cancer or timely diagnosis leading to better prognosis in several cases (CDC, 2021).

Emory Urban Health Initiative Background

Emory University Urban Health Initiative (UHI) is a non-profit organization with the mission to provide health disparities education and advocacy, build collaborative partnerships, and develop best practice models with low-wealth communities and those who work with them to advance equity in health and well-being. The Emory UHI was established in 2009 and is uniquely positioned in tackling the social determinants of health in Atlanta. UHI follows

Emory's Place-Based Strategy for Community Engagement within Emory's Strategic Plan 2005-2015. This approach focuses on 5 priority areas (NPU-V/Pittsburgh Mechanicsville, East Lake, Edgewood, Northwest Atlanta, and Clarkston) and additional focal areas in the Atlanta community where Emory seeks to concentrate its impact. Place-based programs have the potential to be transformational policies for the health and safety of large populations (Branas & Macdonald, 2014).

The organizational structure has a leadership team, project staff, fellows, and volunteers. The leadership team consists of doctors, health practitioners, and professors from Grady Health System, Emory University School of Medicine, and Rollins School of Public Health. Project staff primarily takes care of administration and operations, and management of fellows and volunteers. Some of the partners and program supporters are Grady Memorial Hospital, Wholesome Wave Georgia, and Atlanta Community Foodbank. The UHI programs are aimed to improve health and decrease disparities amongst Atlanta's urban underserved and vulnerable populations. UHI works on the principles of educating healthcare providers about social determinants of health, investing in research to develop and test culturally competent and community-informed interventions, and implementing community outreach programs.

Research Question

How can Emory Urban Health Initiative strategically conduct and benefit from a monitoring and evaluation plan to effectively demonstrate how its programs increase cancer awareness, improve access to low-cost cancer screening services, and reduce cancer mortality and morbidity amongst low-resource communities in Atlanta? To answer this question, a

monitoring and evaluation framework was designed that would eventually be implemented by UHI to improve its program effectiveness and outcomes.

Significance Statement

This report will serve as a resource for Emory Urban Health Initiative as it examines current programs and monitoring and evaluation methods and plans future research endeavors, community-based interventions, and awareness programs providing an evidence-based framework for selecting indicators, means of verification, and outcomes to measure and analyze, designate responsibilities, allocating resources, and enhance fundraising.

Chapter 2

Literature Review

Background

The World Health Organization defines ‘cancer’ as a large group of diseases in almost any organ or tissue of the body when cells grow abnormally, uncontrollably, and grow beyond their usual boundaries to invade adjoining parts of the body and/or spread to other organs (WHO, 2022). Cancer is a major public health problem worldwide and in the United States, as it is the second leading cause of death globally and an important barrier to increasing life expectancy in every country of the world (Bray et al., 2021). Despite extensive research, improvements in treatment, and prognosis over the past several decades, cancer claims around 1600 deaths each day in the United States (Hanna et al., 2020), (Cokkinides et al., 2005). While early detection of cancer and treatment is proving to be crucial in reducing the burden of cancer, not all populations have access to cost-effective screening and treatment options.

Global burden of cancer

The global burden of cancer is estimated by cancer incidence, deaths due to cancer, and DALYs. As per WHO, the burden of disease is calculated using the disability-adjusted life year (DALY). One DALY represents the loss of the equivalent of one year of full health. DALYs for any disease or health condition is the total sum of years of life lost due to premature mortality and years of healthy life lost due to disability due to prevalent cases of the disease or health condition in a population (WHO, 2022). The global burden of cancer is a huge contributor towards mortality and morbidity with different cancers contributing as shown in figure 1 below.

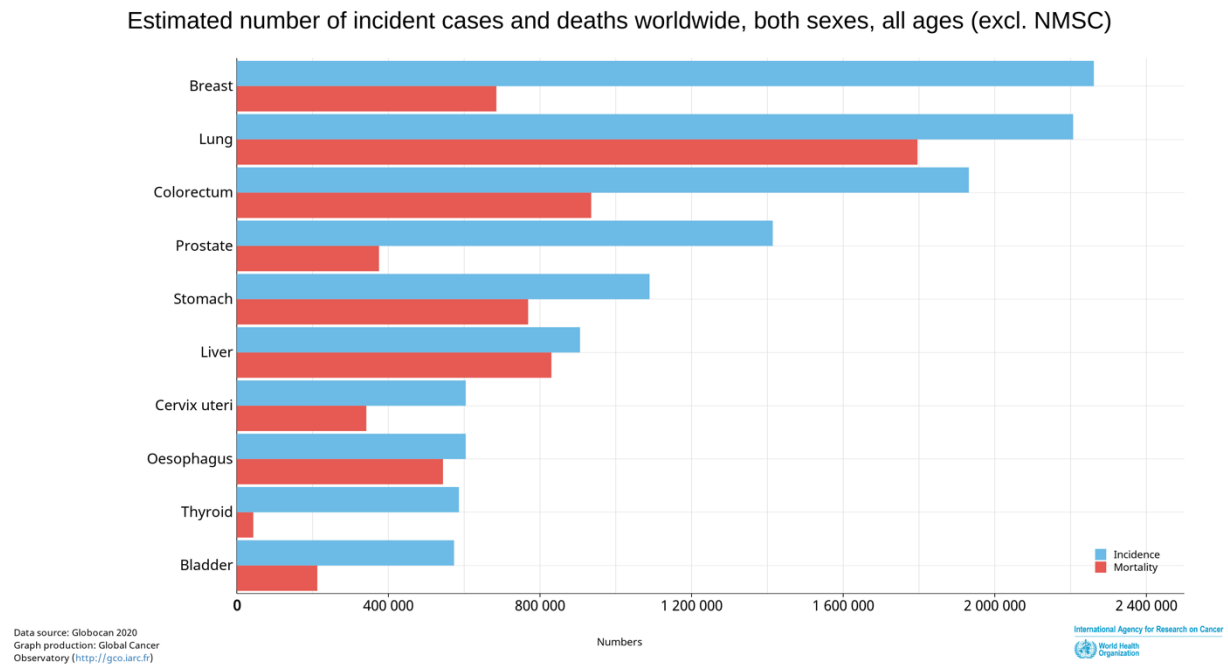

Figure 1: Estimated number of incident cases and deaths due to cancer worldwide, both sexes, all ages (Source: GLOBOCAN, 2020)

As per GLOBOCAN 2020 data, the estimated number of incident cases and deaths for all cancers, in both sexes and all ages is highest in China, followed by the United States, India, and Japan. Globally, in males, the most commonly occurring cancer incidence and mortality are due to lung, prostate, colorectal, and stomach cancers whereas, in females, it is breast, colorectal, lung, and cervical cancers. The GLOBOCAN database is compiled by the International Agency for Research on Cancer (IARC). IARC is an intergovernmental agency forming part of the World Health Organization which conducts and coordinates research about the causes of cancer and collects and publishes surveillance data regarding the occurrence of cancer worldwide.

In 2013 there were 14.9 million incident cancer cases, 8.2 million deaths, and 196.3 million DALYs (Collaboration, 2015). One DALY represents the loss of the equivalent of one year of healthy life. DALYs for any disease or a health condition are the sum of the years of life lost due to premature mortality (YLLs) and the years lived with a disability (YLDs) (WHO,

2022). Prostate cancer was the leading cause of cancer incidence in men with 1.4 million cases, and breast cancer was leading cancer in women with 1.8 million cases. Tracheal, bronchus, and lung (TBL) cancer was leading cause of cancer death in men and women, with 1.6 million deaths in total. For men, TBL cancer was the leading cause of DALYs (24.9 million) whereas, for women, breast cancer was the leading cause of DALYs (13.1 million) (Collaboration, 2015).

Burden of cancer in United States

In 2018, in the United States alone 1,708,921 new cancer cases were reported and 599,265 people died of cancer (CDC, 2021). Moreover, for every 100,000 people, 436 new cancer cases were reported and 149 people died of cancer (CDC, 2021). This is the latest incidence data available for cancer cases and deaths due to cancer. The United States Cancer Statistics (USCS) provides the official federal cancer statistics for the US. It provides a combined cancer registry data collected by CDC's National Program of Cancer Registries and the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program. These data are utilized to understand cancer burden and trends, measure cancer control progress and its preventions efforts, support and inform cancer research, develop actionable items for eliminating disparities, and therefore improve cancer outcomes. In 2018, in the United States, a total of 1,708,921 new cases of cancer were reported, and 599,265 people died of cancer. Figure 1 and 2 shows the number of new cancer cases reported and the number of deaths due to cancers in 2018 respectively, in all age groups, race, ethnicities, and gender. In more than 15 states in the USA, the number of deaths attributed to cancer in 2018 was in the range of 15,148 - 59,961. In the USA, the most commonly occurring cancer is breast cancer followed by lung and prostate cancer.

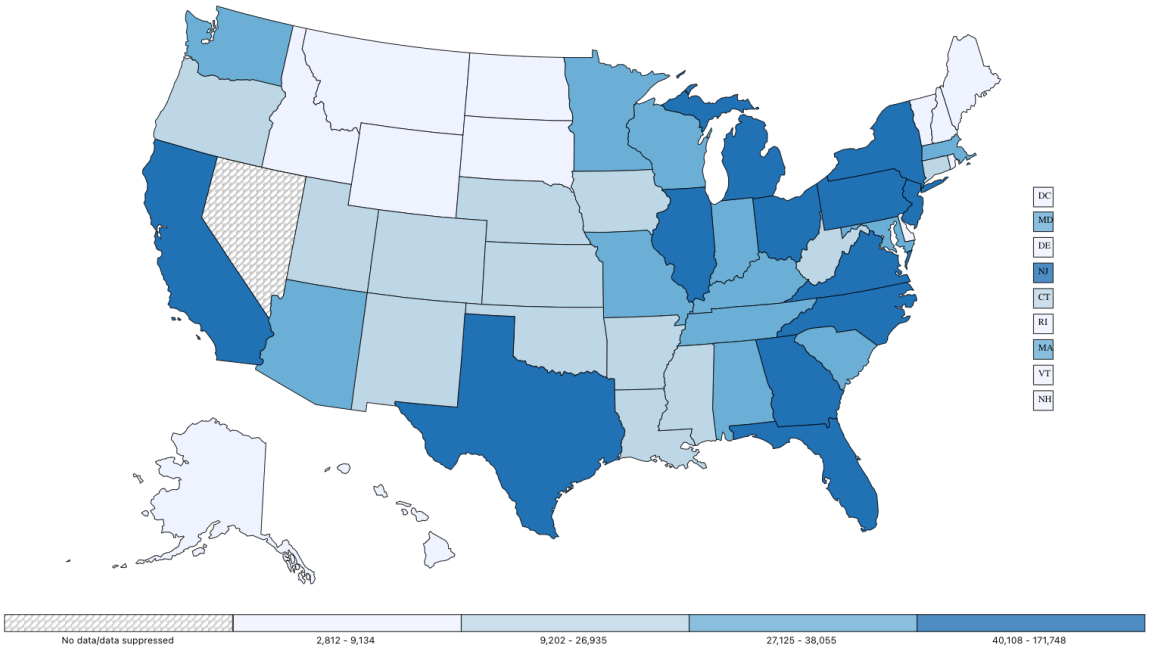

Figure 2: Number of New Cancers in the United States, 2018 (All types of cancer, all ages, all races, and ethnicities, male and female), United States Cancer Statistics

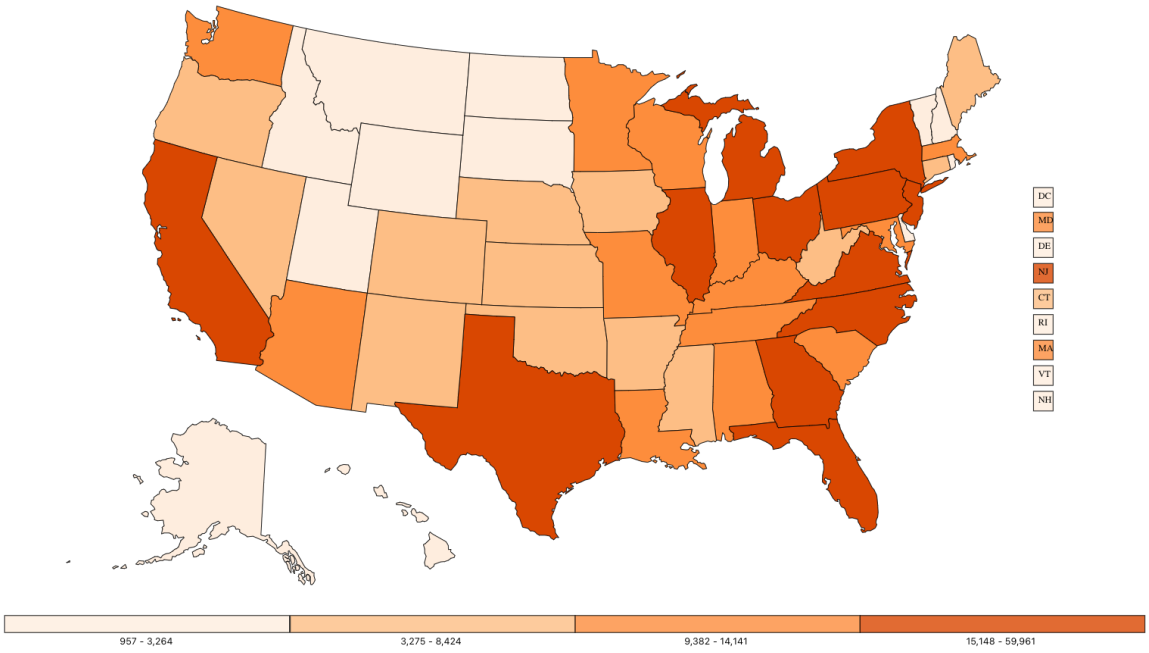

Figure 3: Number of Cancer Deaths in the United States, 2018 (All types of cancer, all ages, all races, and ethnicities, male and female), United States Cancer Statistics

Major causes and risk factors of cancer

Some of the major risk factors of cancer include but are not limited to tobacco use, alcohol consumption, no or limited physical activity, and an unhealthy diet (Wild, 2012b). Other reasons for cancer are obesity, infections, and ultraviolet (UV) radiation. The infectious agents commonly are viruses causing cancer — Helicobacter pylori, Human Papilloma Virus (HPV), and Hepatitis B and C virus. However, these are not the only reasons as cancer is heterogeneous in nature with respect to its geographical distribution, etiology, and pathology, and all this demands a more nuanced, regional, or even local approach for its prevention. The risk factors mentioned are primarily behavioral risk factors and could be modified and altered using behavior change models and awareness programs.

Cancer prevention

Despite the huge burden and impact of cancer, there is evidence that between 1991 and 2015, cancer mortality rates declined by approximately 26% in the United States (Siegel et al., 2020). This huge decline is attributed to improvements in cancer prevention, screening and early detection, timely treatment, and post-treatment service care ((Siegel et al., 2020). Primary prevention is an effective way to fight cancer as about one-half to one-third of cancers are preventable based on available research and knowledge of risk factors (Vineis & Wild, 2014). Primary prevention is defined as the act of intervening before health effects occur, through measures such as vaccinations, altering risky behaviors (such as poor eating habits, tobacco consumption), and banning substances known to be associated with a disease or health condition (Pigeot et al., 2010). Primary prevention has the potential to reduce or eliminate the risk of exposure to carcinogenic agents which is likely to prevent other non-communicable diseases and

provide long-term health benefits (Wild, 2012a). Primary prevention also has economic benefits for nations and individuals and must therefore be prioritized as an integral part of global cancer control. An exclusive individualized approach to prevention is unlikely to have a strong effect on cancer incidence, however, community-based, or societal actions are likely to be more effective (Vineis & Wild, 2014).

Screening — a preventive tool!

Cancer death rates have been found to be significantly higher in socioeconomically disadvantaged areas and populations. This is attributed to health inequalities and reduced access to healthcare disproportionately impacting disadvantaged populations affected by cancer. One of the ways through which these populations in need can seek better health outcomes is through early detection using screening services. Screening has been proven to be effective in the early diagnosis of cancer and initiation of treatment. Screening is defined as checking the body for cancer before one starts showing symptoms. Getting screening tests regularly may help find breast, cervical, and colorectal cancers early (CDC, 2021). CDC also recommends lung cancer screening for those people who are at high risk. In the past few decades, there has been a decline in cervical cancer mortality in the United States due to the increased utilization of cervical cancer screening tests such as Papanicolau (Pap) tests (Campbell et al., 2012). Although screening is an effective tool to detect early signs of cancer and initiate treatment, there are a lot of disparities associated with its availability, affordability, and accessibility in low-income and BIPOC (Black, Indigenous, and People of Color) communities in the United States and globally.

Disparities in screening

Although screening has proven to be a crucial tool in the early detection, prevention, and timely treatment of cancers, there are numerous disparities and barriers impacting society. Disparities in screening constitute availability of screening facilities, awareness of screening programs, utilization of the services, and affordability. These disparities are more severe in low-income and driven by races and ethnicities and greatly differ by the type of cancer.

Racial disparities in screening

In 2017, a systematic review and meta-analysis were conducted to assess racial disparities in screening mammography in the United States (Ahmed et al., 2017). This study included 5,818,380 patients across 39 relevant studies; out of which 43% of patients were white, 33% were black, 17.4% were Hispanic, and 6.2% were Asian/Pacific Islander. The results showed that African American and Hispanic women are less likely to utilize breast cancer screening services as compared to their white counterparts (Ahmed et al., 2017). One of the prime reasons that can explain the less utilization of mammography in these populations is contact with a regular primary physician (Schueler et al., 2008). This is attributed to no or relatively difficult access to primary care providers or not having physician recommended mammography. Access to physicians and health care providers is a systemic barrier for women from minority communities. Other reasons responsible for less utilization are socioeconomic barriers such as income, education level, and unemployment, however, these were less vital than having access to a physician who regularly and repeatedly recommends screening mammography (Schueler et al., 2008).

Research also supports the fact that physicians recommend screening less often for women from low-income communities, who are less educated, and lack health insurance (O'Malley et al., 2001). Another study conducted was conducted in 2010 specifically aimed at exploring possible social, economic, cultural, behavioral, and systems barriers to breast cancer screening among minority women (Alexandraki & Mooradian, 2010). Breast cancer is the second-leading cause of death among women and the most diagnosed cancer among women, in the United States, it is unfortunate to have huge disparities due to the difference in racial identities. Recognizing predictors of screening among minority women and communities and addressing culturally specific barriers may help improve the utilization of screening services (Alexandraki & Mooradian, 2010).

Disparities in rural and urban populations

The disparities also differ in rural and urban populations. The pain and embarrassment associated with screening mammography were identified as barriers particularly in rural women as compared to women belonging to urban communities (Documét et al., 2008).

Disparities due to socioeconomic status

Another crucial factor contributing to disparities in screening is the economic status of communities. Income, poverty level, and educational status have been associated with reduced rates of cervical cancer screening (Bradley et al., 2004). In fact, in several studies, poor socioeconomic conditions have better explained the lower cervical cancer screening uptake than racial and ethnic disparities (Krieger et al., 1999). Traditional screening methods cost hundreds if not thousands of dollars and are not an affordable option for low-resource communities

Disparities in awareness

Awareness of cancer-causing risk factors, screening programs, and their impact on life differs amongst communities. The term, 'Health Literacy' has been defined as 'the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions' (Parker et al., 2003). Studies suggest that younger non-white women with low educational attainment and low income are more likely to be unaware of Pap testing and hence lower screening services uptake (Women, 1995). In addition, the cancer health campaigns, and literature are developed in the same manner for communities with lower literacy levels as they are created for communities with adequate literacy (Lee et al., 1998). This results in confusion and alienation thereby augmenting the problem of low screening rates in such communities.

Other preventive methods

Apart from screening, some other preventive measures are vaccines for certain cancers and adopting a healthy lifestyle or eliminating the risk factors. The human papillomavirus (HPV) vaccine helps prevent most cervical cancers and the hepatitis B vaccine can help lower liver cancer risk. Some of the recommended healthy choices are avoiding tobacco and tobacco-related products, limiting the amount of alcohol intake, moderate exercise, and keeping weight in control (CDC, 2021). However, there are major disparities impacting the availability and utilization of these preventive measures among the minority groups in higher-income countries and low-resource regions of the world (Musselwhite et al., 2016).

Cervical cancer disproportionately affects women without sufficient access to care, with higher rates among minority groups and women in low-income regions (Musselwhite et al., 2016). Cervical cancer remains very common and even though it is preventable through screening and HPV vaccination. Statistics show that close to 26,000 new HPV-related cancers including cervical cancer occur annually in the US (Hirth, 2019). The HPV vaccine has demonstrated high efficacy in the prevention of HPV infection and the incidence of cervical cancer; however, the vaccine uptake hasn't been successful as expected in the United States. Most states do not require HPV vaccination for school enrollment and hence has resulted in barriers that don't exist for vaccines required for school enrollment (Walker et al., 2017). The lack of a recommendation from a healthcare provider is another barrier in HPV vaccination and has been reported by parents (Cheruvu et al., 2017). One study's results showed that parents were concerned that the HPV vaccine might increase high-risk sexual behaviors among adolescents and this could be one of the reasons for low vaccination rates (Ratanasiripong, 2014).

Low rates of vaccination have also been found in young black women (19-26 years of age) and those dependent on public health insurance, the Medicaid (Dempsey et al., 2011). Regarding the geographic distribution, there seem to be lower vaccination rates in southern states as compared to the other regions in the US (Hirth et al., 2014). However, there isn't enough data supporting this distribution explicitly and more data is needed to validate. Moreover, depending on the vaccine type, it is either a two or three-dose series, and completion of vaccine dose series is an important factor in generating immunity against HPV infection. Very recently, a new breakthrough has been seen in this aspect. WHO recommended a single-dose HPV vaccine that has the potential to tackle disparities at multiple levels in different regions of the world (WHO,

2022). WHO Strategic Advisory Group of Experts on Immunization (SAGE) evaluated the evidence that has been under development for the past many years that a single dose vaccine provides comparable efficacy to two or three-dose regimes. This SAGE recommendation has the potential to solve the problem of inequity in access and multiple visits to complete the vaccination schedule.

Community and hospital-based tobacco control interventions are effective when they are implemented within the context of a comprehensive tobacco control program (Control & Prevention, 2007). However, if these interventions are not completely implemented to reach and impact all population groups equally especially those who are at the bottom of socioeconomic status (SES), they have a high potential to exacerbate these disparities. Large-scale antitobacco media campaigns can reduce smoking prevalence and cigarette consumption (Wallace et al., 2007). But the literature suggests that such campaigns are not appealing to low SES populations (Niederdeppe et al., 2008).

Emory Urban Health Initiative

Emory Urban Health Initiative (UHI) carries out a diverse set of projects that are aimed at sustainably addressing the social determinants of health and health disparities through education and advocacy, building collaborative partnerships, and developing best practice models with low-resourced communities in Atlanta. Currently, three projects under UHI impact the cancer incidence and treatment both directly and indirectly. These are —*Tobacco Use Prevention & Cessation (TPC), Cancer Detecting Dogs (CDD), and Dental Diversion (DD) Programs.* UHI works in collaboration with Grady Hospital and local communities in Atlanta.

Tobacco Use Prevention & Cessation

Lung cancer is a highly invasive, rapidly metastasizing, and prevalent cancer, in both men and women in the United States. Lung cancer remains the leading cause of cancer mortality in men and women in the U.S. and worldwide (Lemjabbar-Alaoui et al., 2015). About 90% of lung cancer cases are caused by smoking and the use of tobacco products (Alberg & Samet, 2003). Health care settings are effective platforms to reach populations of tobacco users and engage them in cessation programs and provide personalized assistance and counseling if needed.

UHI partners with Grady Hospital staff, patients, and children by enrolling them in tobacco and smoking cessation and counseling programs by studying perceptions of alternative smoking devices such as e-cigarettes (UHI, 2021). This model adopts a team approach, minimizes the burden on clinicians, and uses counseling by allied professionals and volunteers, using videos and written materials in classroom and community settings to augment clinician advice. This model has been proven beneficial and has been implemented in diverse settings including outpatient, inpatient, dental clinic managed care, and planned parenthood clinics

(Lichtenstein et al., 1996). The tobacco cessation curriculum is based on 5 A's — *ask, advise, assess, assist, and arrange* in that sequence.

Cancer Detecting Dogs

Early detection is one of the most powerful tools in fighting cancer and it has been linked to greater chances of cancer survival (CDC, 2021). However, traditional cancer diagnostic tests cost hundreds and thousands of dollars and are therefore not an affordable option for underserved communities. From a public health perspective, it is imperative to research the use of low-cost cancer detection so that patients have greater access to affordable cancer diagnostic testing. Numerous studies have shown extensive evidence that the olfactory system of canines can detect certain odors, known as volatile organic compounds (VOCs) (Taverna et al., 2015). These compounds are known to be biomarkers of a variety of cancers. While it is a cost-effective alternative to conventional cancer diagnostic tests, the use of cancer sniffing dogs has other benefits, including non-invasive, great reliability, and accuracy (Muppidi et al., 2021).

There are certain types of cancer for which the "cancer dog test" has proved to be remarkably effective, particularly colorectal, ovarian, and lung cancers (Willis et al., 2004). The sniff test is non-invasive, unlike other detection methods, meaning that it is also a safer option for individuals seeking cancer screening. These sniffer dogs use different biological fluids such as urine, breath, blood, and stool for cancer detection (Sonoda et al., 2011). Cancer specialists then use these breaths and other non-invasive sample results to further determine the presence of cancerous lesions and also to rule out cancer post-surgical and other treatment procedures (Muppidi et al., 2021). UHI has partnered with a Florida based laboratory, BioScentDx. This lab is responsible for training the dogs and conducting the tests. UHI collects the samples, stores them, and preserves them, followed by transporting to the lab for analysis.

Sensitivity, specificity, and accuracy

A 2010 colorectal cancer study conducted in Japan demonstrated more than 90% sensitivity and specificity for both stool and breath analysis (Sonoda et al., 2011). In another study in Sweden on ovarian cancer detection which largely remains unnoticed in the initial stages, the sensitivity and specificity in both tissue biopsy and blood sample method confirmed by canine sniffing was greater than 95% (Horvath et al., 2010). In a study conducted in Florida, canines were able to detect melanoma (a skin cancer) with complete accuracy — 100% specificity and sensitivity (Pickel et al., 2004). Some other clinical trials, however, have shown only 80% specificity through canine screening for melanoma cases (Campbell et al., 2013). There haven't been successful results in the case of bladder cancer. Two studies conducted in the United Kingdom demonstrated 64% and 47% specificity respectively (Willis et al., 2011; Willis et al., 2004). Clinical trials conducted by California's Pine Street Foundation for breast and lung cancer have shown close to 99% specificity and sensitivity (McCulloch et al., 2006).

Benefits

Although several studies have shown promising results, it is crucial to weigh other benefits and limitations as that will help us decide the effectiveness of using canine screening methods over traditional methodologies in a clinical setting. The most evident benefit is that canine screening is a relatively cheaper alternative than the traditional ways of screening (Guerrero-Flores et al., 2017). So, individuals who lack healthcare coverage or can't afford expensive screening methods would be highly beneficial through this technique. Another benefit is the nature of these tests being non-invasive and using fluid and breath samples which makes it easier both for the patients and clinicians.

Limitations

A major limitation of canine screening is its lack of efficiency in terms of resources, time, and output. The trained dogs can only work for a certain number of hours, and they can end up with fatigue and/or a lack of motivation. This further limits the number of samples analyzed, scale, and the impact of canine screening. The accuracy is also dependent on the conditioning of canines. Moreover, the canines' accuracy needs to be validated with clinical testing and hence they would need to be under constant monitoring and regular training to improve their detecting skills and accuracy. Although the use of cancer sniffing dogs does have certain limitations and scope for error, it would provide a more affordable and accessible option for cancer screening, making it beneficial to low-resourced populations (Fischer-Tenhagen et al., 2018).

Dental Diversion

The goal of this project is to divert patients from using hospital emergency departments (especially Grady) for dental-related concerns. This is being achieved by reducing the burden of acute dental non-emergency complaints in hospital emergency unit by providing access and diverting patients to community-based dental homes for subsidized oral health care. The project also provides information on referrals for dental concerns to Obstetrics, Primary Care Center, Walk-in Clinic, even if it is a secondary condition. Through this program, the Grady hospital partners with community-based dental organizations like Healing Community Center — a federally qualified health center in Southwest Atlanta that provides comprehensive preventive and restorative oral care.

The patients at Grady are screened for initial signs and symptoms of oral lesions, including precancerous signs and symptoms and restorative concerns. They are referred to the partner

community centers and are treated by the dentists and hygienist team who provide routine and restorative services for children and adults. The objective is to identify early signs and symptoms of oral and oropharyngeal cancers and simultaneously increase awareness and preventive measures for these cancers. Another aspect of this program is to train the Grady primary healthcare providers to be able to screen conducting oral health screenings during primary care exams.

Chapter 3

Report to Urban Health Initiative

Executive Summary

The prevalence of cancer among low-resourced communities of Atlantan metropolitan regions and overall, Georgia is a growing public health concern (Cancer Statistics Center, 2022). The public and private hospitals provide cancer treatment, however, the cost of treatment and associated disparities, awareness about screening, and risk factors associated with cancer, impacts the service utilization and adds to the overall burden of cancer (Islami et al., 2022). The UHI identified three potential programs to solve this problem through Grady Hospital System and other partner organizations. Currently, three programs under UHI are working with an objective to improve cancer awareness, improve access to low-cost screening, and ensure timely treatment. These three programs are —*Tobacco Use Prevention & Cessation, Cancer Detecting Dogs, and Dental Diversion Programs.* These three programs run in partnership with Grady hospital and engage patients at different levels in tobacco cessation programs along with Grady employees, screen patients for cancer using cancer sniffing dogs, screen oral lesions and any dental concerns, and refer them to community dental homes. While the programs are in various stages, it is evident that a monitoring framework would help examine the potential areas of improvement and evaluate program results. This report aims to answer the following research question:

How can Emory Urban Health Initiative strategically conduct and benefit from a monitoring and evaluation plan to effectively demonstrate how its programs increase cancer

awareness, improve access to low-cost cancer screening services, and reduce cancer mortality and morbidity amongst low-resource communities in Atlanta?

Background and Aims

Emory Urban Health Initiative through its programs —*Tobacco Use Prevention & Cessation, Cancer Detecting Dogs, and Dental Diversion* aims to increase cancer awareness through education, improve access to low-cost cancer screening services, and reduce cancer mortality and morbidity amongst low-resource communities in Atlanta. Its mission is to address health disparities through education and advocacy, build collaborative partnerships and develop best practice models with low-resourced communities to advance equity in health and well-being. UHI is considering how to best evaluate the above-mentioned program processes and impacts and contribute to the growing evidence in support of cancer prevention at an early stage and ensure timely treatment. The primary research question is: The primary research question is: How can Emory Urban Health Initiative strategically conduct and benefit from a monitoring and evaluation plan to effectively demonstrate how its programs increase cancer awareness, improve access to low-cost cancer screening services, and reduce cancer mortality and morbidity amongst low-resource communities in Atlanta?

This report has two main objectives.

a. To examine the research question and,
b. Provide recommendations for overarching program development and changes specific to each program as well.

The aim is to support UHI in effectively demonstrating the impact of the three mentioned programs and their value to the communities in the Atlantan metropolitan regions. This report

outlines program-specific logic models, logical frameworks indicating program indicators, means of verification, potential risks, contextual assumptions, identify areas of improvement for improved tracking and data collection strategies, and examines gaps to generate recommendations to inform program design and implementation.

Methods

The process began with collecting UHI's program-specific information, collecting relevant information regarding ongoing and past activities, and initiating conversations with the leadership team, program staff, and coordinators. This was followed by collecting evidence from extensive literature search and review using scientific and published journals, and peer-reviewed articles, identified through PubMed and Google Scholar. Some of the keywords and phrases that were frequently used to facilitate the search were -- cancer, cancer prevalence, screening, disparities in cancer screening, tobacco, low-cost screening methods, risk factors, vaccine, low-income regions, indicators, outcome, impact, evaluations, Atlanta, Georgia, United States, indicators, and evaluation. This strategy helped in finding the relevant articles and journals and further retrieving the additional articles using a snowball approach.

Additionally, program monitoring and evaluation reports were also referred to, both generic evaluation reports and specific cancer screening evaluation reports. These provided supporting evidence in exploring quantitative and qualitative measures and analysis related to cancer awareness, cancer screening and prevention and related outcomes, economic implications, and public health significance. A few papers were also authored and co-authored by the UHI leadership team. Most of the references were also driven by social determinants of health like economic barriers, accessibility and affordability of services, health inequities, racial and ethnic

disparities, geographic distribution, educational level, and gender. All this evidence helped develop this report and the recommendations.

Theory of Change

A theory of change is a systematic study of links between activities, outcomes, and contexts, basically a working theory of how and why an initiative works (Kubisch et al., 2001). The goal of all the three programs put together has an overarching impact of reducing cancer mortality and morbidity. The underlying theory of change is rooted in behavioral health changes through increasing health education, awareness, and health literacy. The *Transtheoretical Model* (TTM), also called as, *The Stages of Change* Model proposes that smokers move through a series of discrete stages before they quit successfully pre-contemplation (no plans of quitting), contemplation (planning to quit), preparation (planning to quit within the next 30 days), action (successful quitting for up to six months), and maintenance phase (abstinence for more than six months) (Gryczynski et al., 2010) (Sharma et al., 2017). In this context, this model holds true for Tobacco Prevention & Cessation program.

The stages of change are cyclical rather linear and the progress through these stages occurs at varying rates (Prochaska et al., 1992). This model ensures an expected improvement in knowledge, attitudes, and behavior toward tobacco products and smoking behaviors thereafter influencing cancer awareness, screening, and utilization of services at Grady or any partner organizations of UHI. Figure 3 shows the stages of behavioral change, and it is very critical to acknowledge that the risk of exiting is huge at any stage of the process. In the UHI context, the physicians and healthcare providers at Grady hospital will ensure tobacco and smoking related

patient history during the examination and understand the patients' perspectives and opinions on this habit and quitting. This will be the first step in helping patients quit smoking.

Based on the conversation, patients will be further engaged in smoking cessation classes and will

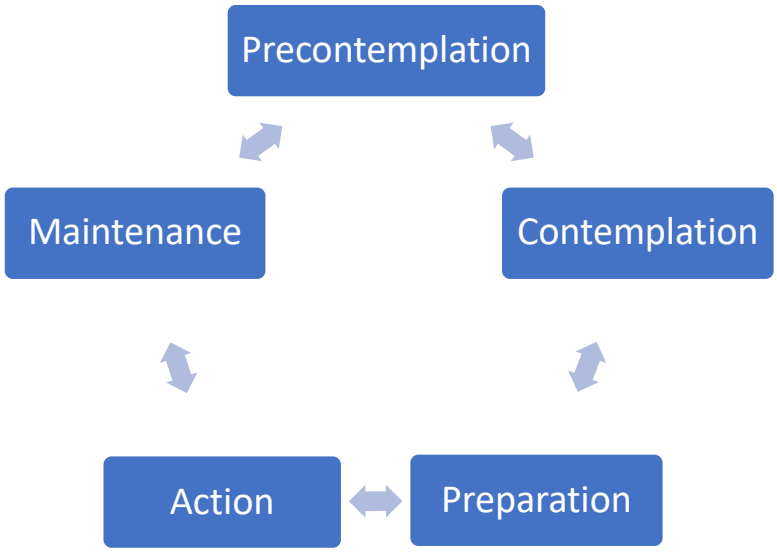

Figure 3: Stages in Transtheoretical Model (CDC, 2004)

be encouraged to attend and follow up as and when necessary.

For the Cancer Detecting Dogs program, the theory of change is based on socioeconomic grounds and ease of cancer detection along with accurate results at par with the traditional methods. If the cancer screening tools are cost-effective, it is a more affordable option and communities in need will be able to avail these cost-effective alternate options over expensive traditional methods leading to early diagnosis and timely treatment (Muppidi et al., 2021). To facilitate this, Emory UHI has partnered with a Florida-based laboratory, BioScentDX, that excels in conducting cancer screening tests using trained canines. The cost of tests is taken care of directly by UHI through grant and donation funds.

The Dental Diversion program's goal is to reduce the burden on the Grady Emergency department for dental concerns and yet provide a platform for patients to address their oral health

needs through partnership with community-level organizations that provide dental care at subsidized rates. UHI and Grady have partnered with Healing Community Center, which provides comprehensive preventive and restorative oral care at multiple locations in Atlanta. It is a federally qualified health center (FQHC) and both public and private insurances are accepted, and these centers are within a walking distance from Marta stations and bus routes. Grady referral patients are given a priority during their appointments.

Another component is its sliding fee scale option that helps those patients who are at the bottom of the salary scale and those who qualify based on household income and family size. Patients need to provide proof of identification, and financial documents supporting their proof of income to avail this offer. It also offers an open-door policy and doesn't require booking an appointment prior in most cases.

Connecting Program Inputs and Activities to Outcomes

The three program-specific logic models reflect the interconnectedness between program resources or inputs, activities conducted, expected outcomes, and the contextual factors that might promote or hinder the achievement of these outcomes. The overarching logic model has six components — inputs, activities, outputs, short and long-term outcomes, and impacts. These components illustrate the association between program design, expected outcomes, or program results (Foundation, 2004). The creation of a logic model is essential to any monitoring and evaluation framework (Kellogg, 2004). A logic model is a systematic and visual tool representing the theory of change that guides the program planning. While the logic model will exhibit linkages between program inputs and resources and connect those with outcomes, it will also support establishing desired long-term outcomes. These models in place will also influence

program priorities and the implementers will tend to have discussions around assessments more frequently. The outcomes are both quantitative and qualitative, however, a monitoring framework will help create measurable deliverables to inform future program planning and implementation.

UHI Logic Models and Logical Frameworks

The three logic models that were developed for Emory Urban Health Initiative (Appendix 1, 4, and 5) include organizational inputs, activities, outputs, short- and long-term outcomes, contextual factors, and underlying assumptions. These logic models were used to inform the logical frameworks that included performance indicators, their means of verification, and the associated assumptions and risks (Appendix 2, 3, and 6). Some of the common and most crucial assumptions are the availability of sufficient funding, adequate staff, and volunteers, engagement, and the response of participants enrolled in the programs. Human resource is a very critical component to keep running the programs without any interruption. The number of UHI staff including the leadership team and board members, program coordinators, and volunteers is crucial in continuing the activities. Some of the activities are fundraising through grant writing and conducting events in collaboration with respective partners, outreach efforts within Grady and the partner organizations through flyers development and distribution, volunteer recruitment, training of volunteers, and engaging them in the program activities. Another ambitious activity is also to keep searching for more donors and partners for effective engagement and the program's success. The outputs follow the activities and are measurable and attributed to the activity performed or carried out.

Tobacco Prevention and Cessation Logic Model and Logical Framework

In Tobacco Prevention and Cessation program, the major activities are the development and distribution of educational materials, conducting tobacco and smoking cessation sessions for patients, educating about the harmful consequences of e-cigarettes and vaping, and arranging follow up sessions as and when required depending on the patient status and phase in the quitting process. This program also aims to involve Grady healthcare providers and employees in tobacco and smoking cessation workshops, and this is a unique way of sustaining a tobacco-free environment on the Grady premises and beyond. The number and frequency of such sessions are important deciding factor in measuring the outputs. The program outcomes are dependent on the completion of these sessions and a follow-up would be helpful in establishing the number of patients who ended up quitting smoking and vaping habits. One crucial assumption with this program is that patients end up doing the follow up sessions and continue to not use tobacco in any form later. This however is not always the case there is a chance of relapse at any stage of the quitting process. This can be evaluated using knowledge check surveys and questionnaires related to attitudes and behaviors. The relevant evaluation questions are:

a. What proportion of patients stopped smoking/using any tobacco products after 3 months?
b. What proportion of patients stopped smoking/using any tobacco products after 6 months or remain tobacco-free?

Some of the key performance indicators would be the number and proportion of patients identified and participated in cessation sessions and the number of sessions conducted over a period of one month, 3, and 6-months. This data could be easily verified with hospital patient records , program records, and attendance logs. These records will be entered and regularly updated by program coordinators using a shared spreadsheet which will be available to the

leadership team, program staff, and volunteers through Basecamp. Basecamp is a software used at UHI as an online collaboration and is a one stop for people to manage their work together and communicate with one another. It is also helpful to keep track of all the tasks, deadlines, files, meeting minutes, and announcements related to a respective project.

Cancer Detecting Dogs Logic Model and Logical Framework

The key program inputs for cancer-detecting dogs are sufficient funding to ensure partnership with the laboratory for breath and fluid sample analysis and results. One of the program strengths is that the cost-effectiveness and accuracy of canine sniffing have been well researched, verified, and documented by the partner lab BioScentDX. This Florida-based laboratory excels in cancer screening through trained dogs and has been conducting research and clinical trials in collaboration with various hospitals in the US.

The key program activities would be to secure regular funding through donation drives, campaigns, individual donations, etc. Each test costs 30 USD which is far less than the traditional methods which cost a few hundred to thousand USD depending on the test and the technique used. However, sufficient funding will ensure that patients who are incapable of paying this amount aren't left out of the screening. There is a need to improve awareness about this initiative through various educational materials like infographics, newsletters, and flyers and finally updating all this information on the UHI website. The measurable program outputs are the number of patients identified for screening and then the number of samples taken and sent to the lab for further analysis. However, the most critical program output is what proportion of patients who were diagnosed positive for any form of cancer was eventually treated at Grady or referred

for further treatment if required. Some of the evaluation questions that guided the development of the logical framework are:

a. How many patients were identified for screening?
b. How many general screenings were done in a month/quarter/6-months?
c. How many of those were screened using sniffing dogs?
d. What proportion of those were treated after the diagnosis?

These can be verified by the Grady patient database and tracking of results obtained in the lab. Like the TPC program, all the information should be regularly entered and updated in a shared spreadsheet and made available to the team via Basecamp software. At present this would be program coordinators' responsibility to retrieve information on each patient identified, samples taken, results, and then track next steps required which would be either validating the diagnosis with other gold standard methods or initiating treatment for the diagnosed cancer or any other disease.

Dental Diversion Logic Model and Logical Framework

The Dental Diversion program inputs are primarily adequate staff including a program coordinator who is responsible for tracking referrals made at the Grady hospital to the partner organization, Healing Community Center. This is very crucial as it will provide an understanding of how many patients need dental specialists and treatment and eventually it will reduce the burden on Grady emergency unit. The driving evaluation questions are

a. How many patients were screened for referral to community dental centers?
b. Proportion of patients who sought oral care at these centers?

c. How many primary healthcare providers at Grady were trained for conducting oral screening?

Another program component is training the primary healthcare providers for conducting oral screening which is crucial for an effective referral. A lot of times, preventive measures, access to the right information, and dental health awareness can help prevent huge problems including oral and oropharyngeal cancers. The program outputs can be measured by the number of patients screened for referral monthly/quarterly/6-months and the proportion of patients who sought oral care at these centers. These can be verified using the referral database at Grady and the corresponding database from referral centers using a shared tracking sheet at both places. This will be under the supervision of the UHI program coordinator.

For all the three programs, there is a need for a monitoring and evaluation team meeting every 1-2 months to track progress and identify areas of improvement.

Chapter 4

Discussion

Monitoring and Evaluation frameworks and feasible implementation of these frameworks have been associated with improved program outcomes and eventually ensure programs' success (Foundation, 2004). Since Emory Urban Health Initiative has about 10-15 programs a time in running and these initiatives are research type, community outreach programs, and health education interventions with healthcare providers at Emory and Grady. Given such a broad range of work, it will be immensely helpful to have an M&E plan to inform program design, implementation, stakeholder management, fundraising, and donor engagement. The logic models will provide a roadmap for the UHI team and stakeholders describing the sequence of events and assessing at each level in the model. These events will help visualize and assess the needs such as — human resources, finances, research needs, and community-based partnerships. These are largely common across all three programs. This analysis will inform the allocation of resources and set priorities based on expected outcomes and results. Moreover, as a program grows and develops, so does its logic model. It is merely a snapshot of any program at a time and a working draft that should be refined as the program develops and needs revisions.

The overarching program goal of improving awareness of cancer, risk factors associated with it, improving cancer screening through low-cost canine screening methods, and improving oral health - all these together will eventually contribute to the reduction of cancer mortality and morbidity focusing on communities with low-resources, homeless people, underinsured, and suffering from other health disparities. However, having an M&E framework will be crucial in gauging the programs' progress and identifying areas of improvement. There is sufficient literature that supports the impact of tobacco prevention and cessation educational programs in

hospitals, academic institutions, and non-profits. The key is to engage primary healthcare providers at Grady and Emory School of Medicine to practice the art of striking conversations with their patients as that's the starting point and most of the program's success is dependent on the initial patient-doctor interaction. This is crucial from patients' point of view as it will influence and shape their will and motivation to continue attending the sessions and reach a time when they are ready to willingly quit smoking and vaping habits.

Cancer Detecting Dogs is a program that directly addresses the disparities in cancer screening which makes it unique and impactful. Overall, for almost all the types of cancers tested and all the commonly occurring cancers, specially trained dogs have reliably made accurate predictions regarding the presence of cancerous lesions (Muppidi et al., 2021). The accuracy of results accuracy, which is collectively measured by sensitivity and specificity, produced by cancer sniffing dogs is quite promising. There is a need to find more community dental homes for the Dental Diversion program. This will be very helpful in reducing the load at a particular referral center and patients will have access to services in different parts of the city. Although, the sliding fee scale is very helpful in addressing patients who are underinsured or don’t have any insurance coverage, however, keeping track of these cases, particularly for the program.

Recommendations

UHI started its programs in the year 2009 and it's been more than a decade. With time it focused on community needs assessment and designed programs that would help people from low-resource settings benefit through its partnerships and engagement. It also focuses on situational public health issues like the COVID pandemic and truly cares about the health disparities. Keeping all these in consideration, it is recommended to hire a Monitoring and Evaluation Lead or Manager to collect all program-related data, use and modify the data collection tools, conduct a stakeholder mapping or analysis, and set realistic targets in consultation with the team, and program coordinators.

The M&E lead would also be responsible for revising program needs and goals. All these together will help roll out the M and E implementation plan. The M&E lead should select monitoring indicators based on anticipated impacts and previous research and needs assessment done by UHI. There is a need to prioritize the implementation of a monitoring and evaluation plan for Cancer Detecting Dogs since an interruption in this program would delay cancer screening leading to delayed diagnosis and poor prognosis. There is a need to practice utilizing free data collection, analysis, and reporting tools like Survey Monkey, Google Forms, Kobo Toolbox, etc. The Basecamp software that is already being used by the UHI team is a great platform to interact and store all program information and inform planning. The M&E lead should take advantage of this platform and try organizing it further.

While the various collaborations are working well, there is a need to indulge in the networking events that happen regularly at various schools at Emory and aid in keeping the program more relevant and engaging. It is also recommended to engage the program leadership and staff members for guest lectures and speak on cancer-related programs and preventive

methods. The volunteer program could be more robust through advertising, make it more organized, and present as a summer internship opportunity and practicum experience in various schools at Emory. UHI could also engage with several student organizations at the Rollins School of Public Health (RSPH) and find ways to develop interest amongst students to create a dedicated UHI student organization that can help coordinate events and spread awareness. UHI should continue to expand collaboration with RSPH, and also develop a strategy to partner with other medical and public health schools to discover new perceptions of their work and ideas for improvement and evaluation.

To keep running the programs and even for rolling out M&E implementation, sufficient funding is very critical. The Cancer Detecting Dogs program requires continuous funds to pay for the lab services utilized as all patients won't be able to bear the screening cost and might end up not getting screened. It is highly recommended to engage with potential donors who would be interested to invest in UHI's mission and vision. Updating UHI's website for better reach and engagement is equally crucial. It will help address the funding needs and challenges to the donors more effectively. UHI already has a few social media platforms, however, the activities, outcomes, or any program-related information needs to be regularly updated.

As one of the key UHI's focuses is research and advocacy, maybe at a later stage, M&E could also take shape of a more comprehensive concept MERLA - Monitoring, Evaluation, Research, Learning, and Adapting. This concept is utilized by a lot of non-profits working in the public health space such as Task Force for Global Health, RTI, FHI 360, etc. This will provide a unique opportunity for program volunteers and interns to engage in UHI's ongoing work and provide valuable recommendations and innovative ideas.

Strengths and Limitations

One of the major program strengths is its close partnership with institutions like Grady Hospital, Emory School of Medicine, and Rollins School of Public Health which is crucial in hiring program volunteers and interns easily and engaging them in relevant work. UHI must tap on this strength and make its UHI fellowship and volunteer program more robust by providing the most updated information on the website, and engaging medical, public health, and nursing students in relevant programs. This strength is also crucial for our M&E implementation. If there is a delay in hiring an M&E lead, few program fellows and volunteers could be engaged in conducting monitoring in collaboration with a program coordinator. Collaboration with various partner organizations is another strength and UHI should engage in collecting feedback from its partners relevant to the program.

Some of the common limitations are designated staff for all programs, however, that could be addressed with more funding opportunities as UHI will need to take care of staff salaries. This, however, is very crucial for the program's success. Another limitation is again the diverse range of programs and too many stakeholders which requires enough people to be able to coordinate and advance the organization's mission. One limitation specific to the TPC program is the complexity and nature of the problem. There is a possibility that patients' who quit the habit might resume it at any stage and wouldn't complete the sessions. This can be addressed by sending message reminders to them to enhance their motivation and encourage them regularly.

Conclusion

Emory Urban Health Initiative programs are driven by the social determinants of health and support low-income Atlantans to live a healthy life through awareness and early screening for cancers of all types. This has helped the uninsured and underinsured seek health services and reduce the risk of getting cancer. However, the data collection and evaluations have been inadequate in demonstrating UHI's impact on people's lives. This thesis report will serve as a comprehensive resource and provide a foundation or starting point to begin the monitoring and evaluation task. It will help to improve data collection, select indicators, revise targets, invite more partnerships and collaborations, monitor, and evaluate strategy with a vision to strengthen research and community outreach programs and effectively demonstrate its impact.

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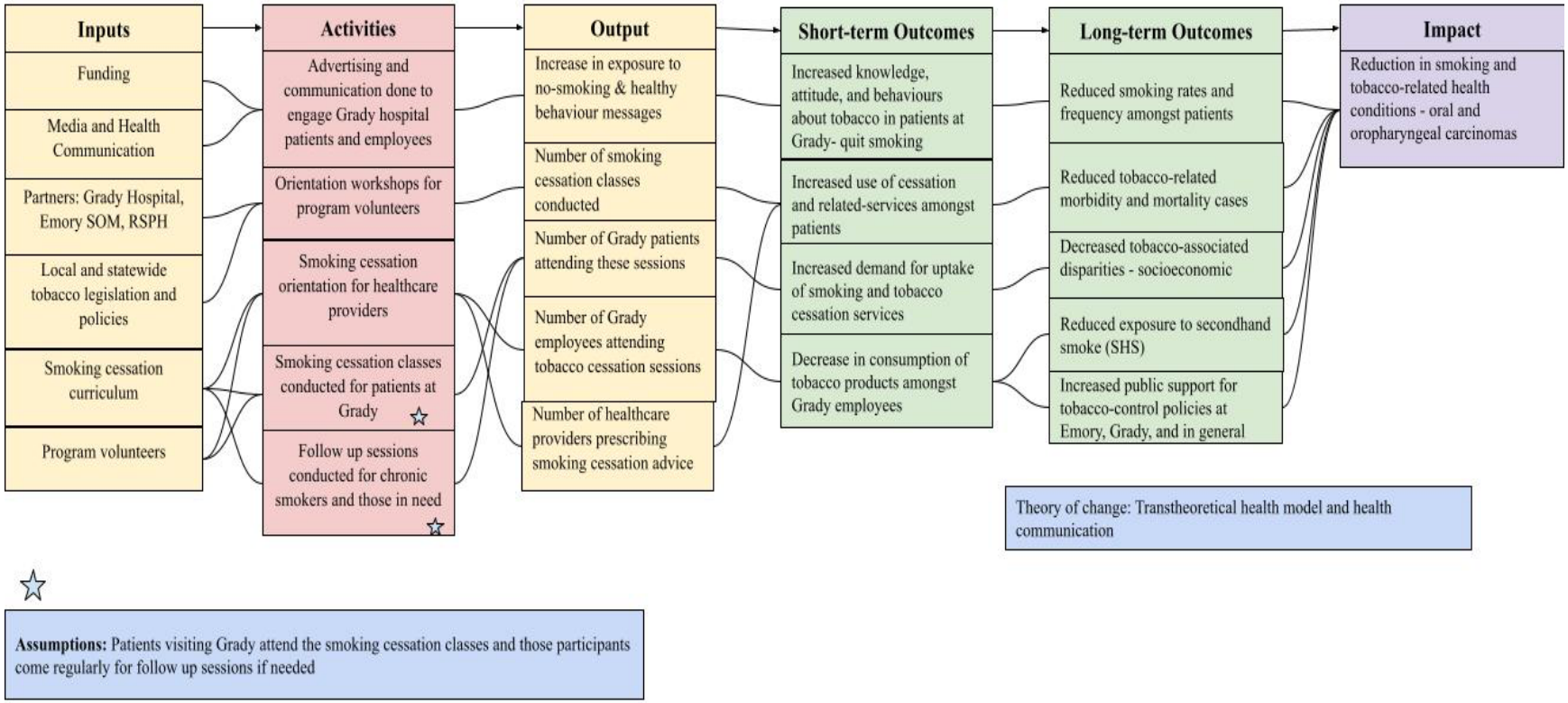
Appendices

List of Figures

Appendix 1: Tobacco Use Prevention & Cessation Logic Model

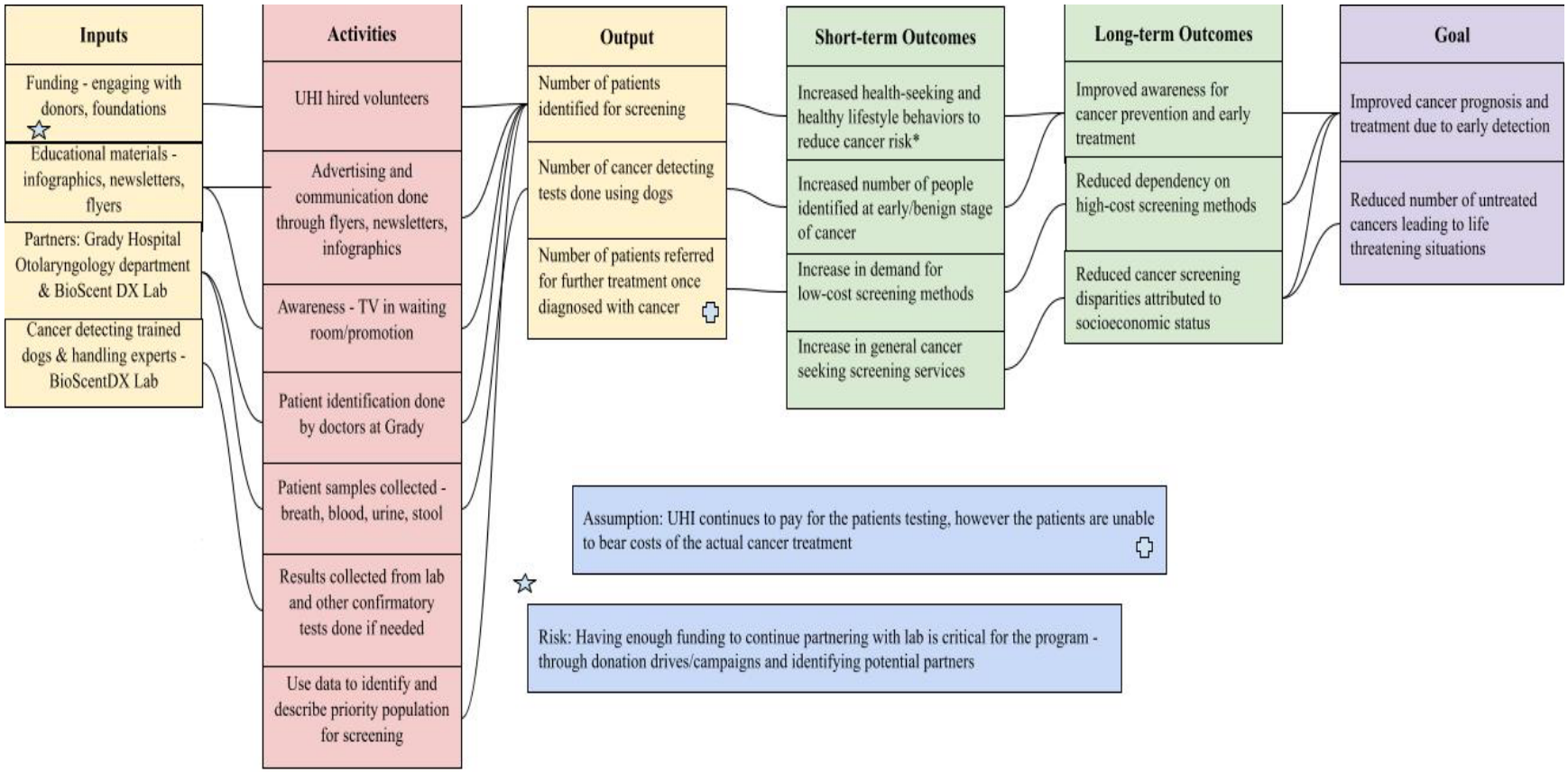


Appendix 2: Tobacco Use Prevention & Cessation Log Frame

Narrative Summary	Performance Indicators	Means of Verification	Assumptions and Risks
Goal: To provide Grady Hospital patients, employees, and Atlanta community members with information and advice about the dangers of smoking and vaping.	● Number of patients diagnosed with any form of cancer or tobacco-related lesion ● Number of patients treated for any form of cancer or tobacco-related lesion	Hospital records reviewed semi-annually/quarterly	There is a possibility that a reduction in the number of smoking cases is not directly associated with tobacco-cessation classes and there could be other contributing factors outside of this program
Outcome: 1. Increased knowledge, attitude, and behaviors about tobacco 2. Increased use of cessation and related services 3. Decrease in consumption of tobacco products 4. Reduced tobacco-related morbidity and mortality case	1. Change in knowledge checks scores pre and post-program done monthly 2. # of tobacco cessation sessions conducted 3. Number of patients with a history of tobacco and smoking in the past 6 months 4. # of patients diagnosed with tobacco-related lesions and cancer	1. Pre and post-program knowledge check survey 2. Monthly assessment of records of sessions 3. Patient history and medical records 4. Monthly Grady hospital records and Georgia Department of Health records	There is a possibility of patients starting to smoke again after few weeks/months or even years i.e. replace attributed to social connections (Thomeer et al., 2019) Changes in employee knowledge, attitudes, and beliefs about tobacco use could also be due to their knowledge attributed to their healthcare profession
Output: 1.1 Exposure to no- smoking and healthy behavior messages 2.1 Smoking cessation classes 3.1 Grady patients and employees attending tobacco cessation sessions 4.1 Healthcare providers prescribing smoking cessation advice and following up	1.1 # and frequency of educational brochures, handouts, newsletters distributed 2.1 # of smoking cessation classes monthly/quarterly 3.1 # of patients and employees who remain tobacco free for 6 or more months 4.1 # of patients seeking cessations services	1.1 Program records and knowledge check survey/questionnaire 2.1 Program records, attendance logs 3.1 Program records, attendance logs, hospital patient records 4.1 Program records, attendance logs, hospital patient records	

Activities: 1.1.1 Developed advertising and communication materials to engage Grady hospital patients and employees 2.1.1 Conducted orientation workshops for program volunteers 3.1.1 Conducted smoking cessation sessions for healthcare providers 4.1.1 Conducted smoking cessation sessions for patients	1.1.1 Number of educational brochures, handouts, newsletters developed 2.1.1 Number of orientation workshops for program volunteers 2.1.2 Number of volunteers participating in these workshops 3.1.1 Number of workshops for healthcare providers 4.1.1 Number of workshops and participants	1.1.1Monthly program records, attendance logs 2.1.1 Program records, attendance logs 2.1.2 Program records, attendance logs 3.1.1 Program records, attendance logs 4.1.1 Program records, attendance logs	Assumption: Distribution of educational materials is an assumption but critical to program's success Follow up sessions conducted for chronic smokers and those in need

Appendix 3: Cancer Detecting Dogs Logic Model

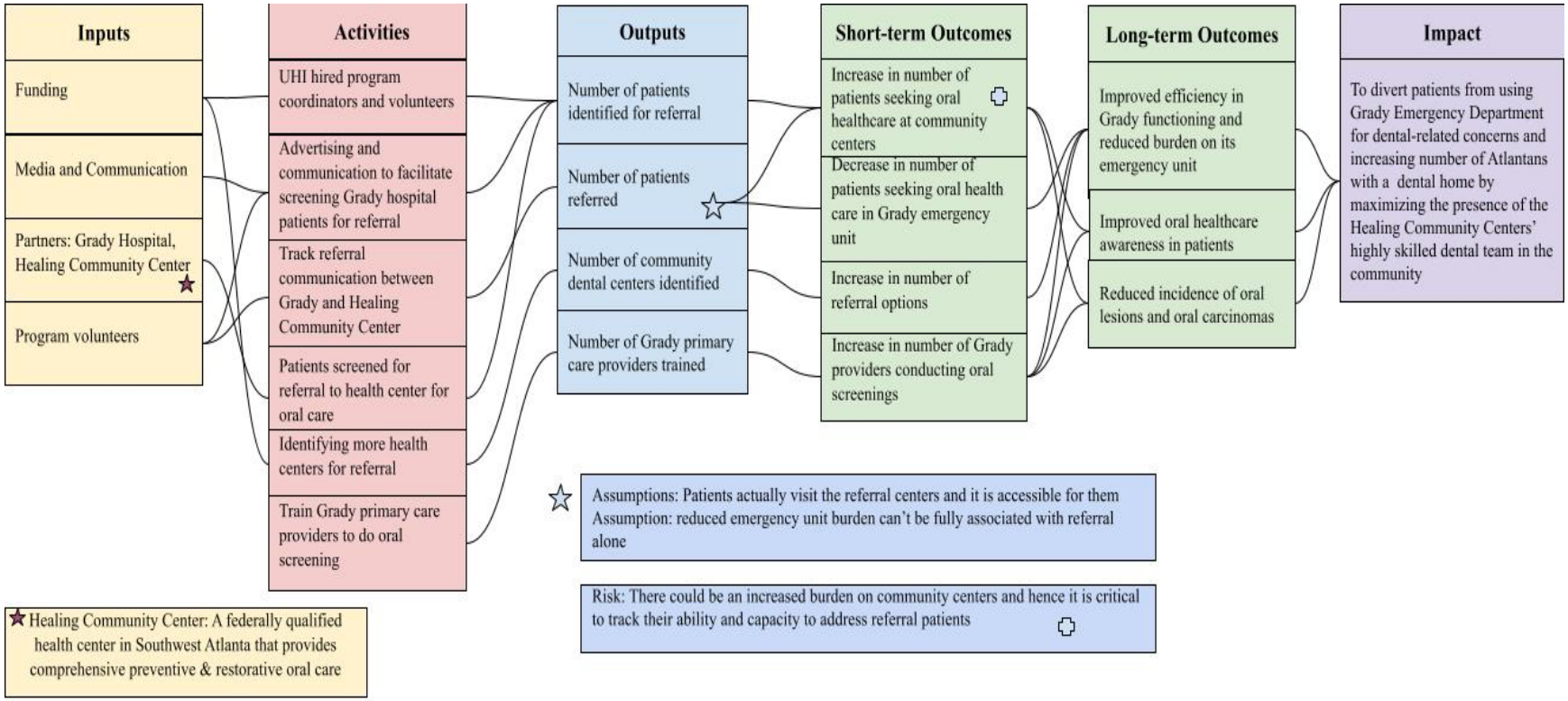


Appendix 4: Cancer Detecting Dogs Log Frame

Narrative Summary	Performance Indicators	Means of Verification	Assumptions and Risks
Goal: To improve ways in helping low-resourced patients have greater access to cost-effective diagnostic cancer testing and improved diagnosis, treatment, and recovery		● Grady Health database ● Proportion of patients screened for cancer signs and symptoms using trained dogs ● Interview with key informants	Risk: Having enough funding to continue partnering with lab is critical for the program - through donation drives/campaigns and identifying potential partners
Outcome: 1. Increased number of patients identified for cancer screening 2. Increased number of samples collected for canine sniffing 3. Increased proportion of patients diagnosed and treated for cancer in early stages	1. Pre and post-intervention improvement/change in # of patients identified for screening monthly 2. Pre and post-intervention improvement/change in # of samples screened 3. Pre and post-intervention improvement/change in # of patients diagnosed and treated for cancer in early stages	1. Grady database and UHI program-record 2. Grady database and UHI lab record 3. Grady database and UHI program records	
Output: 1.1 Patients identified 2.1 Patients' samples collected 3.1 Patients identified for treatment post-cancer or any other diagnosis	1.1 Number of patients identified 2.1 Number of samples collected 3.1 Number of patients for whom treatment started	1.1 Grady database and program records 2.1, Lab records 3.1 Grady database and program records	Assumption: UHI continues to pay for the patients testing, however the patients are unable to bear costs of the actual cancer treatment

Activities: 1.1.1 Identified patients for fluid sample/breath analysis 2.1.1 Samples collected and results obtained from lab 3.1.1 Planned treatment for the diagnosed cancer or any other disease	1.1.1 Number of patients identified 2.1.1 Proportion of samples collected 2.1.2 Number of patients screened using canine sniffing method 3.1.1 Number of patients planned for further treatment	1.1.1 Grady database and program records 2.1.1 Sample database at Grady and program records 2.1.2 Sample database at Grady and program records 3.1.1 Grady patient database and program records	Risk: There might be a need for confirmatory traditional test and that can't be associated directly with the program

Appendix 5: Dental Diversion Logic Model



Appendix 6: Dental Diversion Log Frame

Narrative Summary	Performance Indicators	Means of Verification	Assumptions and Risks
Goal: To divert patients from using Grady Emergency Department for dental-related concerns and increase the number of Atlantans with a dental home by maximizing the presence of the Healing Community Centers' highly skilled dental team in the community	# of patients screened and referred, and treated over a period of time	● Baseline and endline data over a period of 1 month/3 and 6 months ● Key informant interviews	
Outcome: 1. Reduced burden on Grady emergency unit 2. Improved oral healthcare in patients 3. Reduced incidence of oral lesions and oral carcinomas	1. # of patients referred to community centers 2. # of patients who sought oral care and follow-up care 3. Patient history and records during follow-up sessions	1. Patient records at Grady 2. Patient records at Healing Community Center 3. Hospital records and database with program managers	Assumption: reduced emergency unit burden can't be fully associated with referral alone
Output: 1.1 Patients seeking oral health care in Grady emergency department 2.1 Patients seeking oral healthcare 3.1 Grady primary healthcare providers trained in oral screening 4.1 Alternative options/referral centers	1.1 Number of patients diverted to referral centers 2.1 Proportion of patients who sought oral care 3.1 Number of primary healthcare providers trained 4.1 Number of referral centers	1.1 Referral records at Grady 2.1 Referral records at Healing Community Center 3.1 Training records and attendance logs 4.1 Program database	Risk: There could be an increased burden on community centers and hence it is critical to track their ability and capacity to address referral patients
Activities: 1.1.1 Developed and distributed advertising and educational materials 2.1.1 Patients screened for referral 3.1.1 Trained Grady primary healthcare providers 4.1.1 More referral centers identified	1.1.1 Number and types of materials developed and distributed 2.1.1 Number of patients screened and referred 3.1.1 Number of healthcare providers trained 4.1.1 Number of referral centers	1.1.1 Program database- basecamp 2.1.1 Referral and tracking shared spreadsheet 3.1.1 Program and Grady database 4.1.1 Program records	Risk: a referral should be well explained and discussed with the patient or else they might end up not using the service leading to worse oral and general health conditions