

**Using Social Media to Disseminate Public Health Campaigns Around Maternal/Child
Health and Chronic Diseases**

by

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Submitted to the Graduate Faculty of
the Department of Behavioral and Community Health Sciences
Graduate School of Public Health in partial fulfillment
of the requirements for the degree of
Master of Public Health

University of Pittsburgh

2019

UNIVERSITY OF PITTSBURGH
GRADUATE SCHOOL OF PUBLIC HEALTH

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Abstract

In the United States (U.S.), maternal and child health issues and chronic diseases are a public health issue affecting a large proportion of the population. Infant mortality rates are higher than in many developed countries and maternal mortality is increasing. Further, many women do not have access to prenatal health information and care, and children do not have access to necessary health care to ensure positive maternal and child health outcomes. Additionally, chronic diseases such as cardiovascular disease, cancer, and diabetes are among the top causes of mortality in the U.S., with cigarette smoking, overweight, and obesity as related risk factors.

The Allegheny County Health Department, serving western Pennsylvania, conducted a county-wide Community Health Assessment beginning in 2014 to identify health priorities. Results showed that maternal/child health and chronic diseases are among the top five health issues. The Allegheny County Health Survey was then conducted to provide additional data regarding the health priority areas. Disparities in poor maternal/child health outcomes are related to race and geography, with Black mothers less likely to get prenatal care, Black infants more likely to be born preterm and/or with low birth weight, and suburban women more likely to intend to breastfeed than urban women. Disparities in chronic diseases are related to education and income. Individuals without a high school diploma and individuals with an income less than \$15,000 were more likely to have a chronic disease in the county.

The Allegheny County Health Department created health equity briefs to highlight the disparities and suggest action items, then developed a related social media campaign to increase the availability of health information and increase understanding of health disparities in Allegheny County. The campaign will consist of short videos posted on Facebook, Instagram, and Twitter, that provide clear calls to action and refer users to resources in Allegheny County.

Targeted and inclusive health education materials need to be promoted and available where all people can access the information. Social media was chosen for dissemination because messaging can be targeted to specific populations, can be designed to be more inclusive of people with various education and income backgrounds, and is widely available.

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Preface

The basis for this paper was derived from my passion for ensuring that all people have access to quality health care and health education. Our world is constantly changing and is moving toward social media being the primary source of communication. I am thankful for the University of Pittsburgh Graduate School of Public Health Center for Health Equity and the Allegheny County Health Department for giving me the opportunity to help develop a plan for disseminating their findings from their Community Health Assessment and Allegheny County Health Survey to help inform Allegheny County residents of proper health education.

I could not have achieved success in my master's program without Dr. Martha Ann Terry. She has played an instrumental role in my decision to study Behavioral and Community Health Sciences and has guided me throughout the program. Secondly, my thesis committee members have each provided guidance and advice throughout this process. Lastly, my mother, family, and close friends have all been extremely supportive. Thank you all for your support and contributing to my success.

1.0 Introduction

In the United States (U.S.), infant mortality is high, and racial/ethnic disparities indicate that Black infants are at a higher risk for infant mortality compared to White infants. Women often have limited access to necessary prenatal health education that could ensure the best health outcomes for pregnancy and labor. Infant mortality and maternal mortality are both indicators of quality of health care. Additionally, maternal mortality has been rising in the U.S. Racial/ethnic disparities demonstrate that maternal mortality affects Black women at much higher rates than White women. In addition, geographic disparities in Allegheny County, in Pennsylvania, suggest that there is a need for better prenatal health education in specific areas.

Equally important, chronic diseases are among the top causes for mortality in the U.S. Diabetes is one of the most prevalent chronic diseases and impacts a large proportion of the population. Obesity is associated with several chronic diseases, and with proper weight loss, risk for other chronic diseases can be reduced. Interventions that promote physical activity and cessation of cigarette smoking can help to lower individuals' risk for chronic diseases.

This paper discusses the role that social media campaigns can have as a mode of dissemination of public health awareness of disparities in maternal/child health and chronic disease outcomes. The Background chapter is a review of literature and discusses indicators for maternal and child health issues, maternal and child health risk factors, and the impact of poor maternal and child health in the U.S. It also provides evidence for interventions that could help to improve maternal and child health outcomes.

Additionally, the first chapter discusses the risk factors for chronic diseases, the racial/ethnic disparities that exist, and efforts to prioritize for prevention of chronic diseases. Evidenced-based strategies focused on prevention of chronic diseases, such as the Truth Campaign which tries to prevent smoking in youth, are discussed. This paper provides an example of how social media campaigns can be effective for dissemination of public health information as well as providing a call to action for individuals who view the social media messaging.

The Assessments chapter discusses the goals and objectives that derived from the Community Health Assessment that the Allegheny County Health Department conducted in 2014. The assessment led to an initiative called “Plan for a Healthier Allegheny,” which promotes the health and wellness of Allegheny County residents by addressing priority health issues, which include maternal/child health and chronic diseases. The initiative addresses several goals and objectives that were developed in collaboration with over 70 stakeholders who influence the health of residents in Allegheny County.

The Results of the Community Health Assessment and Allegheny County Health Survey chapter discusses the data collected and analyzed by The Allegheny County Health Department, as a result of the health assessment and health survey. These data illustrate the racial/ethnic and geographic health disparities in Allegheny County associated with maternal/child health and chronic diseases. The data from the assessment also demonstrate income disparities and identify resources in the county to help prevent poor health outcomes in Allegheny County. Additionally, this chapter explains the methods for disseminating this information through the use of health equity briefs and a social media video campaign. The health equity briefs were created to give insight on health disparities in Allegheny County and to provide a call to action.

In the Social Media Campaign chapter, the goals and objectives for the social media video campaign are discussed. This chapter explains how using videos on social media can help to create awareness with the goal of reducing poor maternal/child health outcomes and reducing the prevalence of chronic diseases and increase proper management of chronic diseases in Allegheny County.

In the Discussion chapter, solutions to the health issues in Allegheny County are addressed. Disparities related to maternal/child health and chronic diseases are also reviewed. This chapter explains that targeting videos for the social media campaign will be necessary to ensure that the videos are inclusive and comprehensible to people from all educational, income, and racial/ethnic backgrounds.

The Conclusion chapter discusses the main risk factors for maternal/child health issues and chronic diseases in Allegheny County. This chapter also explains how different groups of people are affected by maternal/child health issues and chronic diseases and provides strategies for improving these issues in the county.

2.0 Background

2.1 Maternal and Child Health as a Public Health Issue

Maternal and child health is an important public health issue. Globally, women and infants have inadequate or no access to necessary, quality antenatal health services (World Health Organization, 2014). In the U.S. racial/ethnic disparities suggest that Black/African American women and children have less access than other racial groups (Gadson, Akpovi, & Mehta, 2017). Women often do not have access to proper prenatal health education to ensure the best health outcomes for pregnancy and labor. According to Healthy People 2020 goal MICH-10.2, only 70.5% of pregnant women received early and adequate prenatal care in 2007 (U.S. Department of Health and Human Services, 2019c). Efforts need to focus on improving access to adequate prenatal health education and quality antenatal health services for Black/African American women and children.

Maternal mortality is an indicator of the quality of healthcare globally. It is defined by the World Health Organization (WHO) as “the death of a woman while pregnant or within forty two days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes” (WHO, 2019). The death of a mother has implications for the health status of the child and family members (MacDorman, Declercq, Cabral, & Morton, 2016). In the United States, the maternal mortality rate has increased by 26.6% from 18.8 deaths per 100,000 live births in 2000 to 23.8 deaths per 100,000 live births in 2014 (MacDorman et al., 2016). This indicates a need to focus on improving maternal health care to prevent maternal death from occurring.

To improve maternal and child health outcomes, it is necessary to focus on the continuum of care, which includes access to health care for mothers, newborns, and children (Kerber et al., 2007). As the Kerber et al. (2007) study points out,

The continuum of care for maternal, neonatal, and child health requires access to care provided by families and communities, by outpatient and outreach services, and by clinical services throughout the lifecycle, including adolescence, pregnancy, childbirth, the postnatal period, and childhood. Saving lives depends on high coverage and quality of integrated service-delivery packages throughout the continuum, with functional linkages between levels of care in the health system and between service-delivery packages, so that the care provided at each time and place contributes to the effectiveness of all the linked packages (Kerber et al., p. 1359).

For pregnant women, antenatal care is necessary, in addition to linkage to a skilled birth attendant to ensure a safe childbirth. For mothers and babies, postnatal care during the first six weeks after birth is critical (Kerber et al., 2007). Providing a continuum of care for mothers and babies can reduce the risk for poor maternal and child health outcomes and improve the chances of mother and child survival.

Maternal and child health issues affect the mother, the child, and the family. Various health conditions can arise from poor maternal and child health conditions. Some of these are preterm birth, low-birth weight, Sudden Unexplained Infant Death (SUID), maternal mortality, and infant mortality. These poor health outcomes affect different portions of the population differently. For instance, there are racial/ethnic and geographic disparities related to maternal and child health outcomes. In the U.S. from 2004-2011, Black infants were at a higher risk for mortality than White infants in all counties in the U.S. (Rossen, Khan, & Schoendorf, 2016). Geographically across all counties in the contiguous states between 2004-2011, the largest disparities were in the eastern region of the U.S., specifically in regions around the Great Lakes, in the northeast, the mid-Atlantic region, and parts of Florida (Rossen et al., 2016).

Many factors play a role in maternal and child health outcomes. Maternal health factors that can result in positive health outcomes include prenatal care, smoking cessation, intent to breastfeed, and family planning. Child and infant health factors that can result in positive health outcomes include immunizations, healthy birthweight, safe sleep, and breastfeeding. Resources that can improve maternal and child health outcomes include provider availability, social support, and use of home visiting programs (Allegheny County Health Department, 2018c).

Nationally, non-Hispanic Black infants are dying at higher rates compared to White infants. The infant mortality rate for non-Hispanic Black infants in 2014 was 10.9 per 1,000 live births, compared to 4.9 per 1,000 live births for non-Hispanic White infants. The leading causes of infant mortality for non-Hispanic Black infants in 2014 were low birthweight, congenital malformations, maternal complications, and sudden infant death syndrome, respectively (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, & Division of Vital Statistics, 2019). The leading causes of infant mortality for non-Hispanic White infants in 2014 were congenital malformations, low birth weight, sudden infant death syndrome, and unintentional injuries, respectively (U.S. Department of Health and Human Services et al., 2019). The percentage of mothers who received late or no prenatal care in 2014 was 9.7% for non-Hispanic Black mothers, compared to 4.3% for non-Hispanic White mothers (U.S. Department of Health and Human Services, 2017).

Based on data from the U.S. Department of Health and Human Services (2017), the infant mortality rate for non-Hispanic Black infants is 2.2 times higher than the infant mortality rate for non-Hispanic White infants. For non-Hispanic Black infants, death due to complications related to low birthweight is 3.2 times higher compared to non-Hispanic White infants. Non-Hispanic Black infants had a sudden infant death syndrome mortality rate more than twice as high as the

rate for non-Hispanic White infants in 2014. In addition, in 2014, non-Hispanic Black mothers were 2.2 times more likely than non-Hispanic White mothers to get late or no prenatal care (U.S. Department of Health and Human Services, 2017).

A study (Howland et al., 2019) conducted between 2008-2012 analyzed the determinants of severe maternal morbidity and its racial and ethnic disparities in New York City. Severe maternal morbidity is defined as “unexpected outcomes of labor and delivery that result in significant short- or long-term consequences to a woman’s health” (Centers for Disease Control, 2017). It was determined that women with advanced maternal age (aged 35 or older), multiple births, previous cesarean delivery, or pre-existing chronic disease are at elevated risk for severe maternal morbidity. Regarding racial/ethnic disparities, Black non-Latina women experienced higher rates of severe maternal morbidity compared to their White counterparts. In this New York City study, the severe maternal morbidity rate for Black non-Latina women was 386.9 per 10,000 delivery hospitalizations and for White non-Latina women was 126.7 per 10,000 delivery hospitalizations (Howland et al., 2019). Other common risk factors were not receiving any prenatal care, having multiple births, being morbidly obese, and a diagnosis of diabetes, hypertension, or heart disease (Howland et al., 2019). This study demonstrates that non-Latina Black women are at a higher risk for severe maternal morbidity, and that chronic diseases can be a risk factor.

2.2 Chronic Diseases as a Public Health Issue

Though people are living longer, chronic diseases, such as cardiovascular diseases, diabetes, and cancer, are impacting the health of many individuals. It is estimated that 25% of Americans have multiple chronic conditions (Centers for Disease Control and Prevention, 2018c).

These conditions can affect one's ability to perform activities of daily living (Centers for Disease Control and Prevention, 2018c). Chronic diseases are a critical public health issue because they are preventable. To reduce the risk of chronic disease, it is important to promote physical activity and cessation of cigarette smoking, and to improve access to healthy and affordable foods, including fruits and vegetables (Dietz, Douglas, & Brownson, 2016; Moore & Thompson, 2015).

In the United States in 2015 and 2016, six out of the top ten causes of mortality were due to chronic diseases. Heart disease, cancer, chronic lower respiratory diseases, stroke, Alzheimer's disease, diabetes, and kidney diseases caused the most deaths in the United States in that order (Centers for Disease Control and Prevention, 2017). Obesity is also associated with several chronic diseases, including type 2 diabetes, coronary heart disease, several cancers, and increased mortality (Pantalone et al., 2017). Obesity is defined as a Body Mass Index (BMI) of greater than or equal to 30 (Ogden, Carroll, Fryar, & Flegal, 2015). The prevalence of obesity in the U.S. increased significantly over time, from 13% during 1960-1962 to 36.5% during 2011-2014 (Ogden et al., 2015; Pantalone et al., 2017). Managing obesity can play a role in the prevention of chronic diseases.

Chronic diseases affect a large proportion of adults in the U.S., and diabetes is one of the leading causes of death (Centers for Disease Control and Prevention, 2017). In the U.S., non-Hispanic Black adults are suffering from diabetes at higher rates compared to non-Hispanic White adults. Between 2013-2015, the prevalence rate for diabetes for non-Hispanic Black adults was 12.1%, compared to 7.4% for non-Hispanic White adults (Centers for Disease Control and Prevention, 2018a). Non-Hispanic Black adults are also dying due to diabetes at higher rates compared to their White counterparts. In 2013, the age-adjusted diabetes death rate for non-Hispanic Black adults was 39.5 deaths per 100,000 population compared to 18.6 deaths per

100,000 population for non-Hispanic White adults. These data indicate that non-Hispanic Black adults are 80% more likely to be diagnosed with diabetes compared to non-Hispanic White adults (U.S. Department of Health and Human Services, 2016b).

There are several risk factors for diabetes, which include obesity and overweight, hypertension, and cigarette smoking. According to the U.S. Department of Health and Human Services, non-Hispanic Black adults have the highest rates of being overweight or obese compared to other racial/ethnic groups. Being overweight is defined as having a BMI of 25 or higher. In 2011, 76.3% of non-Hispanic Black adults compared to 68.5% of non-Hispanic White adults were overweight or obese (Centers for Disease Control and Prevention, 2016).

Diabetes is a risk factor for heart disease, a chronic condition that raises concern. Among adults diagnosed with coronary heart disease in the United States, 6.5% were non-Hispanic Blacks compared to 6.2% of non-Hispanic Whites. In addition, the heart disease death rate per 100,000 was 215.5 for non-Hispanic Blacks and 171.8 for non-Hispanic Whites (U.S. Department of Health and Human Services, 2016c), indicating that non-Hispanic Black adults are dying from heart disease at much higher rates than non-Hispanic White adults.

Cigarette smoking is a risk factor related to heart disease, diabetes, and other chronic health conditions. In 2011, 18.7% of non-Hispanic Black adults were current cigarette smokers, compared to 21% of non-Hispanic White adults. Because smoking increases the risk of developing diseases such as coronary heart disease, stroke, and lung cancer, it is important to focus efforts on reducing the prevalence of cigarette smoking (Centers for Disease Control and Prevention, 2018b).

Various evidenced-based initiatives have been implemented nation-wide to improve overall health and reduce prevalence of chronic diseases. One example is the Truth campaign. The mission of the Truth campaign is “to achieve a culture where all youth and young adults reject

tobacco” (Truth Initiative, 2019). The campaign aims to accomplish this through education, tobacco-control research and policy studies, community activism and engagement, and innovation in tobacco dependence treatment (Truth Initiative, 2019). The Truth initiative targets youth and young adults through platforms they use the most, including those online, in order to make a connection with them. The campaign disseminates information about the health effects and social consequences associated with tobacco use so that individuals can make informed decisions and influence others to do the same (Truth Initiative, 2019). Based on the results from the Truth Finishit Campaign, which was re-launched in 2014 targeted toward adolescents aged 15-21, there was an increase in attitudes in favor of smoking cessation, in addition to a reduction in intentions to smoke over time (Vallone et al., 2018). Cessation of cigarette smoking is important because it can lower a person’s risk for chronic diseases (Campos et al., 2014).

2.3 Social Media Campaigns and Public Health

Social media allows humans to communicate on an internet platform with other humans (Fuchs, 2013). Communication on social media is interactive and can be done through creating and sharing information or ideas through virtual communities and networks (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011). Information can be shared in the form of text, photos, or videos (Kaplan & Haenlein, 2010). Social media platforms can typically be accessed using any device capable of using the internet, which can include desktop computers, tablets, or smartphones (Kaplan & Haenlein, 2010).

U.S. federal agencies are increasingly using social media, such as Facebook, to engage with the public to disseminate health-related information and promote and encourage health-

related discussions (Bhattacharya, Srinivasan, & Polgreen, 2017). In a recently published analysis (Bhattacharya et al., 2017), researchers reviewed over 45,000 Facebook posts by 72 Facebook accounts that belonged to 24 health agencies as of late January 2013. This study discovered that Facebook posts that contained visuals, such as photos or videos, or positive sentiments had the most user-engagement. This was the first comprehensive analysis of user-engagement with U.S. federal health agencies on Facebook (Bhattacharya et al., 2017).

Social media campaigns for public health are cost-effective but require more human and time resources compared to some other forms of health communication such as print materials (Freeman, Potente, Rock, & McIver, 2015). Evaluating the effectiveness of online campaigns can be difficult, especially since a limited number of publications discuss these types of results. However, research does show that social media can impact behavior change and can also be an effective means for motivating the public to take action related to their health. Moreover, online campaigns tend to work best when there is a clear call to action for the audience to take (Freeman et al., 2015).

Additionally, social media videos are more likely to influence a behavior compared to social media images (Liu, Chou, & Liao, 2015). In a study conducted by Liu et al. (2015) that looked at product placement in social media, it was found that using videos rather than images have an increased chance of affecting advertising attitudes and can lead to a better brand impression (Liu et al., 2015). Moreover, it was found that product placement in social media through videos can also increase users' intention to click the advertisement (ad) (Liu et al., 2015). This study also determined that subtle rather than prominent placement can increase users' intention to click the ad (Liu et al., 2015). Additionally, videos that are shorter in length are more likely to have better user engagement. For example, a professional video hosting platform for

businesses determined the optimal video length for user engagement as being 1-2 minutes with 70% user engagement seen at this length (Figure 1) (Fishman, 2016). However, when videos are longer than two minutes, user engagement drops down to 65% at three minutes, and a little over 50% at seven minutes (Fishman, 2016). Therefore, the optimal video length to keep users engaged is less than two minutes.

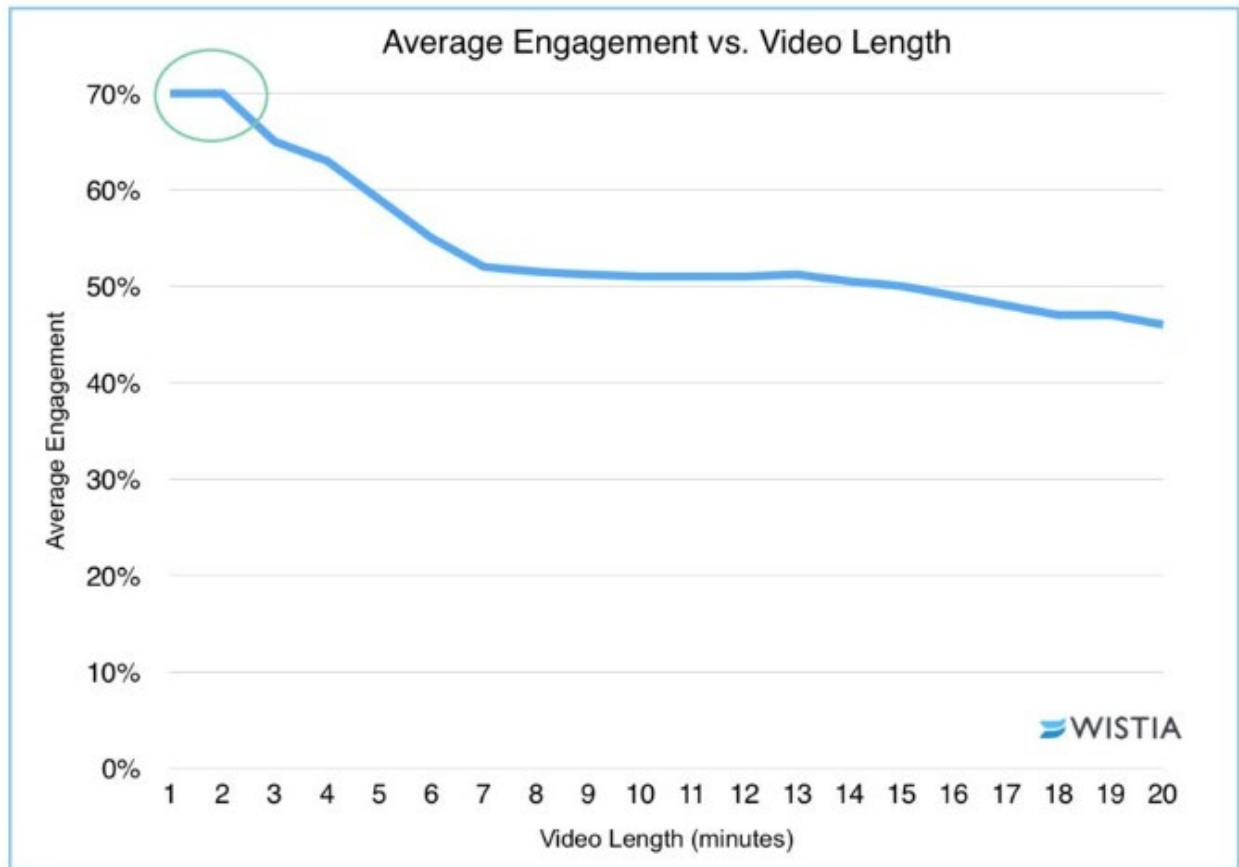


Figure 1 Average Engagement vs. Video Length
(Fishman, 2016)

To target the appropriate audience, using existing networks to build the capacity of the campaign is most effective. This means that people do not have to create new accounts just to access information, which makes it easier for those the campaign is trying to influence to make a positive health behavior change (Freeman et al., 2015).

As noted, use of social media is an increasingly popular method for health communication; however, effectiveness of its use is not well defined. This uncertainty is particularly due to the various components that contribute to a successful social media campaign. A meta-analysis conducted by Chan and Chen (2019) examined the effectiveness of using social media and mobile health applications (apps) for pregnancy care. These researchers wanted to determine the effectiveness of these interventions for improving health outcomes for pregnant and postpartum women (Chan & Chen, 2019). In order to measure effectiveness, researchers calculated effect size using a random effects model and examined the characteristics of interventions (Chan & Chen, 2019). Based on this methodology, researchers found that publication bias exists because interventions with positive results and small sample sizes were the most likely to be published. According to one published study, when social media was used to promote lifestyle changes, a moderate effect on maternal weight control and maintaining optimal weight composition was seen (Chan & Chen, 2019). In a study conducted by Santoso et al. in 2017, researchers observed that health outcomes can improve for mothers and infants when fathers are positively involved in pregnancy care and birth preparedness through the use of social media.

Chan and Chen's (2019) meta-analysis also provides an example of how it is becoming more common for pregnant women and their partners to utilize social media for accessing health knowledge and learning to identify risk behaviors and danger signs during pregnancy. This meta-analysis of the effects of social media and mobile health apps on pregnancy care found that social media can provide women with a platform for obtaining health information (Chan & Chen, 2019). It also found that pregnant and postpartum women were increasingly relying on social media as a source of health information.

Based on the aforementioned examples, social media can be a useful tool for disseminating health-related information to pregnant and postpartum women. Though social media can be effective, research suggests that it should not be the only form of communication. Traditional forms of health communication, such as print materials and other online resources should still be used (Freeman et al., 2015).

A meta-analysis by Zhao, Freeman, and Li (2016) examined effectiveness of health-related apps to influence a health-related behavior change. All 33 included studies were conducted in high-income countries, including the U.S. (Zhao, Freeman, & Li, 2016). These studies showed that personalized messages for increasing physical activity, weight control and diet control are more likely to affect a positive health behavior change than generic messaging (Zhao et al., 2016). Overall, this meta-analysis determined that including aspects of behavior change theories, including self-monitoring, goal setting, self-tracking, social support, and being motivated, can positively impact health behavior changes (Zhao et al., 2016).

A review of the literature revealed little published research that discusses the impact of using social media platforms to promote better public health. However, several programs, including Milwaukee's social media campaign, aimed to reduce racial disparities associated with infant mortality. Programs such as Milwaukee's are using social media to empower minority women and families to make positive health behavior changes to impact health outcomes (Herzog, 2014). Most of these studies use mobile messaging in tandem with social media marketing on social media websites (Chan & Chen, 2019). These programs have yet to be evaluated, which is likely due to the programs being recently initiated.

Former U.S. Secretary for Health and Human Services, Kathleen Sebelius, directed the Secretary's Advisory Committee on Infant Mortality (SACIM) to develop recommendations for

eliminating infant mortality. SACIM recommended using digital messaging and social media as tools for sending preventive and health promotion messages to new mothers (Lu & Johnson, 2014). This recommendation was part of the national strategy to reduce infant mortality. Though the impact of the national strategy proposed by the Committee has yet to be evaluated, it does show support by a U.S. governing agency for this kind of intervention.

Specifically, for government agencies using social media to promote health-related information, it is important to note posts with positive sentiment are associated with higher activity among social media users (Bhattacharya et al., 2017). Also, introducing posts as questions on social media may encourage users to comment, but users are less likely to like or share posts that are in question format (Bhattacharya et al., 2017). So, it is important to consider this when developing a social media campaign. Additionally, social media posts from government agencies that refer to activities and behaviors are positively associated with level of user engagement (Bhattacharya et al., 2017). When looking at specific social media platforms, Facebook posts are more likely to have likes and shares than retweets on Twitter (Giustini, Ali, Fraser, & Boulos, 2018). So, the social media platform being used can be important when trying to disseminate public health information.

Although there are several advantages to using social media such as increasing users' social support, self-care, ability to access more health information, and information sharing, there are some challenges associated with social media usage for public health (Abadi & Sheikhtaheri, 2015). One of the issues that users may face when using social media is discerning the reliability of the information being presented, having a lack of privacy and confidentiality due to the openness of social media, and information overload (Abadi & Sheikhtaheri, 2015; Giustini et al., 2018). Because of the challenges that users may face when using social media, it is important to have

guidelines in place that protect users' privacy and confidentiality, and also that helps to prepare the health care system for the potential usefulness that social media can have for public health (Abadi & Sheikhtaheri, 2015).

Overall, social media can be beneficial for public health communication because it allows for engagement with a large population. Using social media for public health dissemination also can increase the availability of health information by allowing users to share content with their already existing networks. In addition, social media allows for peer support since it is interactive (Kite, Foley, Grunseit, & Freeman, 2016). The project discussed in this paper will use social media to engage with and promote health information to hard-to-reach residents and those affected disproportionately by poor health outcomes in Allegheny County.

2.3.1 Evaluating Effectiveness of Social Media Campaigns

When planning an evaluation of health promotion, it is important to consider who received the intervention, what the impact of the messaging had, and what changes in health behavior and health outcomes can be related to the intervention (Korda & Itani, 2013). There are several evaluation frameworks and metrics that exist for this type of intervention, which include the RE-AIM framework and using Google Analytics.

The RE-AIM framework addresses Reach (representativeness of the targeted population), Effectiveness (primary outcomes), Adoption (rate of user engagement and representativeness among settings, resources, and implementation staff), Implementation (consistency of program delivery and costs of delivering the program), and Maintenance (sustainability of the program) (Korda & Itani, 2013). This framework is used to “translate research into practice” by incorporating all components of program planning to assist in effective program evaluation (Korda

& Itani, 2013). The RE-AIM framework can be an effective method for evaluating health-related social media campaigns.

Another method for method for evaluating health-related interventions on social media is Google Analytics (Korda & Itani, 2013). Google Analytics can provide information on the number of hits a website received, time spent on a webpage, the location of the audience, and many other data (Korda & Itani, 2013). Though these data can be useful, it does not inform the evaluator if the messages were received appropriately, so there is no way to know if the intervention impacted a health behavior change or health outcomes by using Google Analytics alone.

Overall, for proper evaluation, it is important monitor the progress of the intervention while it is being implemented. Also, the evaluation needs to measure whether or not the messages were received by the targeted audiences (Korda & Itani, 2013). It is also necessary to assess the impact of the intervention through evaluation of health status outcomes (Korda & Itani, 2013). Tracking website visitors throughout the process can help with determining if the messages are reaching the targeted audiences (Korda & Itani, 2013). However, incorporating the RE-AIM framework in addition to a program such as Google Analytics would be the most effective method for evaluating a health-related social media campaign (Korda & Itani, 2013).

3.0 Assessments

3.1 Community Health Assessment

The Allegheny County Health Department in Pennsylvania completed a Community Health Assessment in the county in 2014 (Kurta, 2015). The purpose of the assessment was to get an understanding of the health issues that needed to be prioritized in the county. The Community Health Assessment was the first step toward the Plan for a Healthier Allegheny, an initiative to improve the health of residents in Allegheny County. The Plan for a Healthier Allegheny was a result of the collaboration of over 70 stakeholder organizations that impact health throughout Allegheny County (*Plan for a Healthier Allegheny 2015, 2017a*).

This was the first time an assessment of this sort was conducted within Allegheny County. The purpose was to identify community health issues, and to set goals for improving and monitoring the progress of such health issues. The assessment included both qualitative and quantitative data sources, which included the following:

1. “An online health indicator survey to identify top health concerns (>1,000 residents responded),
2. A synthesis of 15 Allegheny County non-profit hospital health assessments,
3. Existing data compiled on top health concerns identified in the health survey and stratified by race, gender, and geography, and
4. Health concerns identified by over 400 county residents during 14 community meetings” (Centers for Disease Control and Prevention, 2018a).

The assessment determined that maternal/child health, chronic diseases, access to health care, mental health and substance abuse, and environmental health were the issues that needed the most focus within Allegheny County.

3.2 Plan for a Healthier Allegheny

Implementation of the Plan for a Healthier Allegheny, the second phase following the Community Health Assessment, includes the Live Well Allegheny initiative through the Allegheny County Health Department. Live Well Allegheny is a plan for increasing resources to improve the health of Allegheny County residents, focusing mainly on chronic disease prevention. This initiative is listed in the health equity brief developed for chronic diseases, so that residents can have access to this resource.

3.2.1 Plan for a Healthier Allegheny Maternal/Child Health Goals and Objectives

The goal for achieving improved maternal and child health outcomes was to “reduce morbidity and mortality, by improving the health and quality of life of women, infants, children, caretakers, and their families, especially in vulnerable communities”(Plan for a Healthier Allegheny 2015, 2017b, p. 34). The objectives for achieving this goal are as follows:

- “Reduce asthma-related emergency room visits and hospitalizations among all children (age 0-17), particularly targeting the Medicaid population;
- Increase the proportion of mothers with intent to breastfeed when leaving the hospital and reduce the disparity between White and Black populations;

- Reduce the proportion of preterm, low birth weight, and very low birth weight births;
- Reduce the overall infant mortality rate and the disparity in rates between White and Black populations; and
- Link actions existing systems for families, with children aged pregnancy to eight years to address unmet needs in children’s health” This particular objective was developed from Project LAUNCH (*Plan for a Healthier Allegheny 2015, 2017c*, pp. 34-37).

3.2.2 Plan for a Healthier Allegheny Chronic Diseases Goals and Objectives

The Plan for a Healthier Allegheny intends to meet several goals and objectives. For chronic diseases, the goal is to “decrease preventable chronic disease by assuring access to resources, knowledge, and opportunities for residents to adopt healthy behaviors” (*Plan for a Healthier Allegheny 2015, 2017d*, p. 24). The objectives to achieve this goal are as follows:

- “Decrease obesity in school-age children;
- Increase fruit and vegetable consumption among adolescents and adults;
- Increase the number of residents by who participate in either moderate or vigorous physical activity in a usual week;
- Reduce county cigarette smoking rate among all residents and reduce racial disparities; and
- Reduce smoking during pregnancy” (*Plan for a Healthier Allegheny 2015, 2017a*, pp. 24-28)

3.3 Allegheny County Health Survey

The Community Health Assessment set priorities for the county and played a role in the development of the Plan for a Healthier Allegheny. The Plan for a Healthier Allegheny outlined metrics and action items for the county to address. The purpose of the Allegheny County Health Survey (ACHS) was to understand the health risks in the community. The questions in the survey were based on the CDC Behavioral Health Risk Factor Surveillance System. The survey is essential for

- “Measuring [Allegheny County’s] progress; and
- For partnering with public and community organizations, appointed and elected officials, and researchers to improve public health” (Allegheny County Health Department, 2017).

To determine improvements in health factors throughout the county, the survey findings were compared to data from the 2010 ACHS. It also assessed existing health disparities for new indicators for determining the well-being of Allegheny County adults.

The ACHS provided most of the data presented in the health equity briefs. The ACHS survey was conducted from August 2015 through September 2016 and included 9,007 phone interviews (Allegheny County Health Department, 2017). The phone interviews were conducted over both landline and cellular phones (Allegheny County Health Department, 2017). Participants in the survey were randomly selected using a digital direct dial computer system within each of the 13 County Council Districts (Allegheny County Health Department, 2017). Seventy one percent of individuals contacted responded to the interview. Among respondents, 58% were female, 12.9% self-identified as African American, 45.6% had an income less than \$50,000, and 29.4% were 45 years old or younger (Allegheny County Health Department, 2017).

4.0 Results of the Community Health Assessment and the Allegheny County Health Survey

4.1 Maternal and Child Health

The Healthy People 2020 (HP2020) goal MICH-1.3 aims to reduce the rate of overall infant deaths (within of year of age) to 6.0 deaths per 1,000 live births in the U.S. by the year 2020 (U.S. Department of Health and Human Services, 2019c). In Allegheny County, the infant mortality rate, defined as the number of infant deaths under one year of age, is 5.9 deaths per 1,000 live births in Allegheny County (Allegheny County Health Department, 2018a). The infant mortality rate in 2016 in Allegheny County was much higher for Black infants (14.9 deaths per 1,000 live births), compared to White infants (3.3 deaths for per 1,000 live births) (Allegheny County Health Department, 2018a). The infant mortality rate in Allegheny County has been slowly decreasing from 1990 - 2015, but infant mortality among Black infants remains much higher than the overall infant mortality rate. In 1990, the infant mortality rate among Black infants was four times higher than the infant mortality rate among White infants. In 2015, the infant mortality rate among Black infants was over three times higher than the infant mortality rate among White infants. Of note, the infant mortality rate among White infants remained below the overall infant mortality rate within Allegheny County over this time period, from 1990-2015 (Figure 2) (Allegheny County Health Department, 2018c). In Allegheny county, the overall infant mortality rate meets the HP2020 MICH-1.3 target. However, Black infants are not close to meeting the target, and White infants have already met the target- further illustrating the racial disparities associated with infant mortality in Allegheny County.

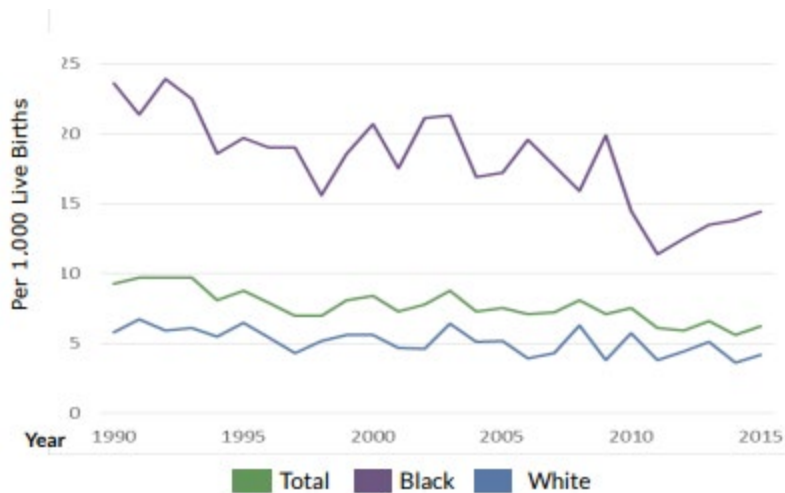


Figure 2 Infant Mortality Rate in Allegheny County by Race
(Allegheny County Health Department, 2018c)

Resources exist to help reduce infant mortality. One of the ways infant mortality can be reduced is to initiate prenatal care early in the pregnancy. The HP2020 MICH-10.1 goal aims to achieve 77.6% of pregnant females receiving early and adequate prenatal care by the year 2020 (U.S. Department of Health and Human Services, 2019c). In Allegheny County, only 54% of Black mothers initiated prenatal care within the first trimester of pregnancy, compared to 76% of White mothers (Allegheny County Health Department, 2018c). So Black women are far behind reaching the HP2020 MICH-10.1 target. On a positive note, more than 95% of mothers overall received prenatal care at some point during their pregnancy (Allegheny County Health Department, 2018c).

Smoking during pregnancy increases the risk of poor birth outcomes. The HP2020 MICH-11.3 goal aims to have 98.6% of females delivering a live birth report abstaining from smoking cigarettes during pregnancy (or have only 1.4% of females delivering a live birth report smoking cigarettes during pregnancy) by the year 2020 (U.S. Department of Health and Human Services, 2019c). In Allegheny County, 15% of all mothers reported smoking at least one cigarette during pregnancy. The rate is even higher among Black mothers, of whom 19% report smoking before

and/or after pregnancy, compared to 15% of White mothers (Allegheny County Health Department, 2018c). The rates of smoking during pregnancy in Allegheny County are not even close to meeting the HP2020 MICH-11.3 target for eliminating pregnant mothers who smoking during pregnancy.

The intent to breastfeed among pregnant women in Allegheny County has increased over time (Figure 3). In fact, among Asian/Pacific Islander women, over 90% intended to breastfeed by 2015. In 2015, almost 80% of White women, over 70% of women of multi-race, and over 60% of Black women intended to breastfeed. Geographically, women living in suburban areas in the county had higher rates for intention to breastfeed compared to women living within the City of Pittsburgh. The lowest rates for intention to breastfeed are among women who live in river communities in the county, with only 40%-56% of women in the majority of these communities intending to breastfeed (Figure 4) (Allegheny County Health Department, 2018c). HP2020 MICH-21.1 aims to increase the proportion of infants who were ever breastfed in the U.S. (U.S. Department of Health and Human Services, 2019c). The target for this goal is to have 81.9% of infants breastfed by the year 2020 (U.S. Department of Health and Human Services, 2019c). Though this goal does not specifically look at intent to breastfeed, it helps to have this comparison as a benchmark. In Allegheny County, Asian/Pacific Islander women exceed this target, and White women are close to meeting this target. However, Black women and women living in river communities still have much room for improvement.

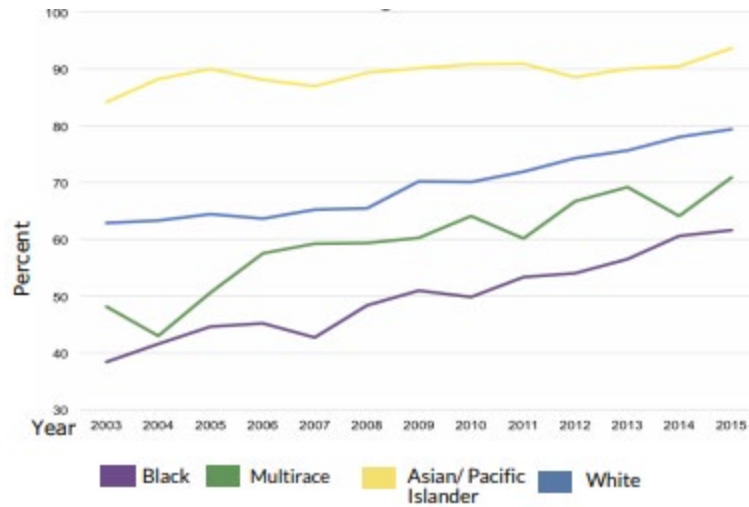


Figure 3 Percent of Mothers Who Intend to Breastfeed in Allegheny County by Race (Allegheny County Health Department, 2018c)

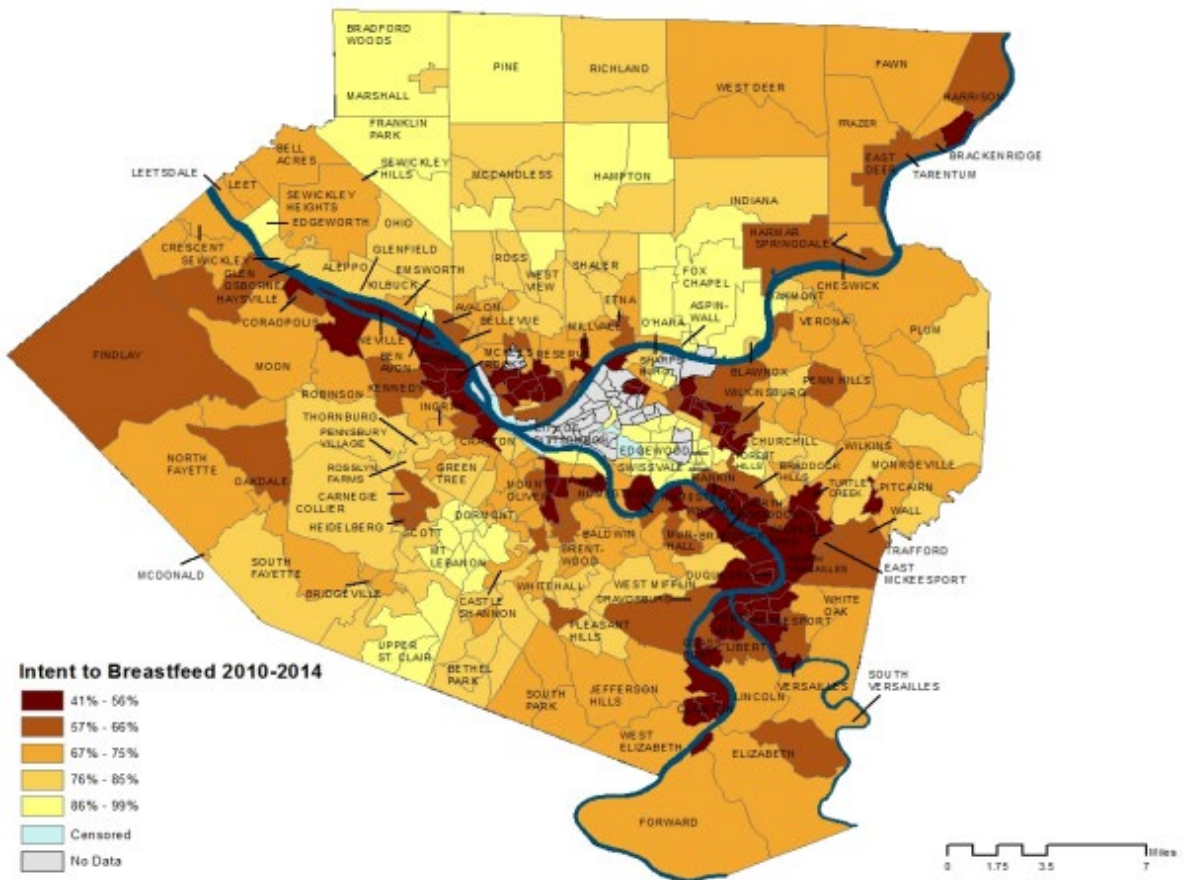


Figure 4 Intent to Breastfeed in Allegheny County by Geography*

*Reference PA Department of Health and Informatics-Family Health (Allegheny County Health Department, 2018c)

Birthweight is an accurate predictor of infant health, and low birthweight puts an infant at greater risk of premature death. Low birthweight is defined as infants who weigh less than 2500g at birth (*Plan for a Healthier Allegheny 2015, 2017a*). For HP2020 the goal is to reduce the proportion of infants born with low birth weight in the U.S. through objective MICH-8.1. This objective aims to reach the target of only 7.8% of infants being born with low birth weight by the year 2020 (U.S. Department of Health and Human Services, 2019c). In Allegheny County, Black infants are born with low birthweight at a higher percentage compared to other races. In 2015, over 15% of Black infants were born with low birthweight, compared to over 9% Asian/Pacific Islander infants, over 8% of multi-race infants, and 6% of White infants (Figure 5) (Allegheny County Health Department, 2018c). Black and Asian/Pacific Islander infants have still not met the HP2020 MICH-8.1 target in Allegheny County.

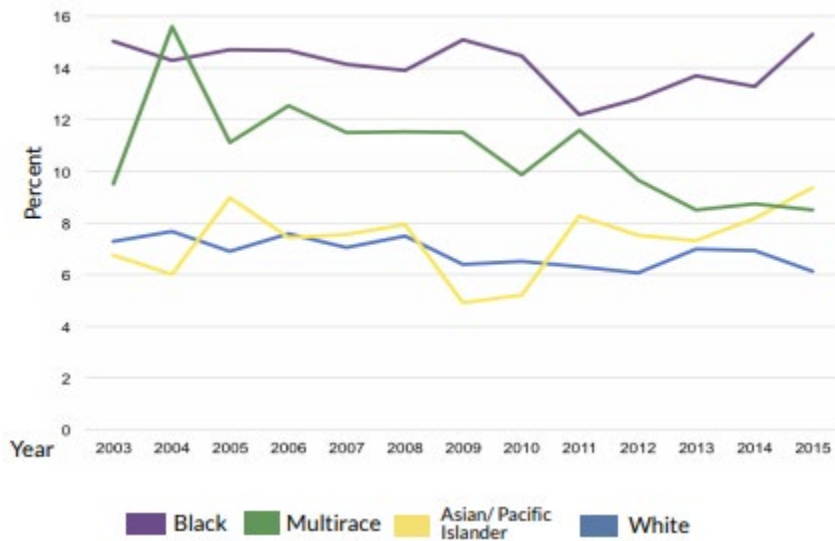


Figure 5 Percent Low Birthweight in Allegheny County by Race
 (Allegheny County Health Department, 2018c)

Preterm birth is a factor that can play a role in the infant’s health. HP2020 target for objective MICH-9.1 aims to reduce the percentage of preterm births to 9.4% in the U.S. by the year 2020 (U.S. Department of Health and Human Services, 2019c). Overall, preterm birth rates have been slowly decreasing overtime in Allegheny County. However, Black infants are consistently among those with the highest percentage of preterm births at 13% in 2015. In 2015, 10% of White infants were born preterm and 8% of multi-race and Asian/Pacific Islander infants were born preterm (Figure 6) (Allegheny County Health Department, 2018c). The rate of preterm births for Black infants is still too high. The rate of preterm births for White infants is close to meeting the HP2020 target, and Asian/Pacific Islander infants have already met the HP2020 MICH-9.1 goal in Allegheny County.

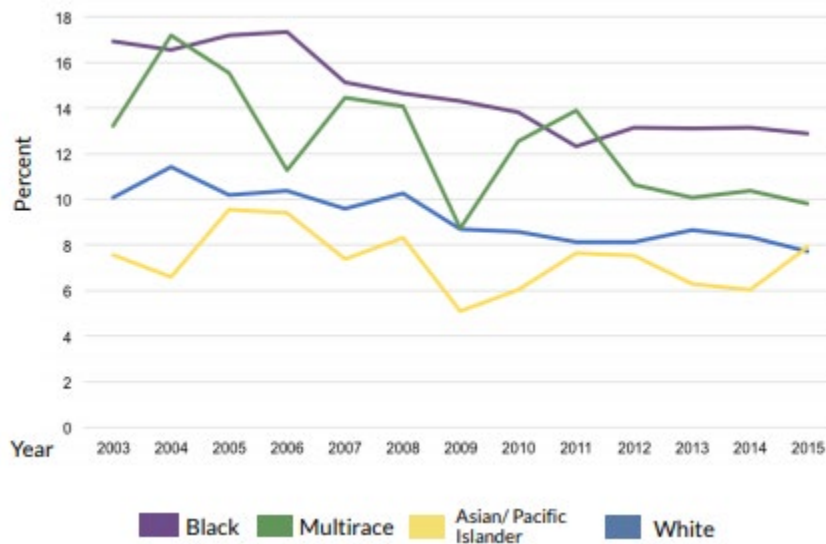


Figure 6 Percent Preterm Births in Allegheny County by Race
(Allegheny County Health Department, 2018c)

HP2020 goal MICH-1.9 aims to reduce the rate of Sudden Unexplained Infant Deaths (SUID) to 0.84 infant deaths per 1,000 live births by the year 2020 (U.S. Department of Health and Human Services, 2019c). SUID is defined as the “sudden and unexplained death of a baby less

than one year old in which the cause was not obvious before investigation. These deaths often happen during sleep” (Centers for Disease Control and Prevention, 2018d). In Allegheny County, Black infants are more likely to experience mortality due to SUID compared to White infants. Between 2011-2015, 2.3 per 1,000 births among Black women, compared to 0.7 per 1,000 births among White women resulted in SUID (Allegheny County Health Department, 2018c). Black infants have not met the HP2020 goal, while White infants have exceeded the goal for HP2020 objective MICH-1.9.

Overall, many health disparities related to maternal and child health are seen in Allegheny County. Black mothers had the highest percentage of reported smoking during pregnancy, and Black infants had the highest rates and percentages of infant mortality, low birthweight, preterm birth, and SUID. Black mothers also had the lowest percentages of prenatal care initiated within the first trimester of pregnancy and of intention to breastfeed. Geographically, the poorest maternal and child health trends were seen among communities along the Ohio and Monongahela rivers in Allegheny County. Furthermore, Black women and Black infants are the most negatively affected by poor maternal and child health outcomes within Allegheny County, compared to other races.

4.2 Chronic Diseases

In addition to maternal and child health issues being cause for concern in Allegheny County, many adults are suffering with chronic diseases. Chronic diseases affect a large proportion of adults in Allegheny County. Several factors can impact the development of chronic diseases. Both behavioral and clinical factors can put an individual at a greater risk for chronic diseases.

The behavioral risk factors for chronic diseases measured in Allegheny County were smoking, fruit intake, vegetable intake, and physical activity. HP2020 goal TU-1.1 aims to reduce cigarette smoking among adults to 12% by the year 2020 in the U.S. (U.S. Department of Health and Human Services, 2019f). Based on the Allegheny County Health Survey conducted between 2015-2016, 19% of the population in Allegheny County reported smoking every day or some days, while 30% of non-Hispanic Blacks, and 17% of non-Hispanic Whites reported smoking every day or some days (Allegheny County Health Department, 2017). In Allegheny County, neither non-Hispanic Blacks nor non-Hispanic Whites have met the target for HP2020 goal TU1.1. Moreover, non-Hispanic Blacks are much further away from reaching this HP2020 target compared to non-Hispanic Whites in Allegheny County.

HP2020 has a goal of increasing the contribution of fruits to the diets of individuals aged two years and older (U.S. Department of Health and Human Services, 2019d). According to HP2020 objective NWS-14, the target is to have individuals aged two years and older consume 0.93 cup equivalents of fruit per 1,000 calories (U.S. Department of Health and Human Services, 2019d). Though the HP2020 target is not directly comparable to the data collected in Allegheny County, it does provide a benchmark. Overall, 3.5% of adults in Allegheny County reported they had no fruit intake within the past week. When analyzed by income, 8% of individuals making less than \$15,000, and 2% of individuals making more than \$75,000 reported no fruit intake within the past week (Allegheny County Health Department, 2018b).

HP2020 objective NWS-15.1 has the goal to increase the contribution of total vegetables to the diets of the population aged two years and older, with the target of 1.16 cup equivalents of vegetables per 1,000 calories (U.S. Department of Health and Human Services, 2019d). Though the HP2020 goal for vegetable consumption is not directly comparable to Allegheny County data,

it does provide a benchmark. Overall, 1.6% of adults in Allegheny County reported no vegetable intake within the past week (Allegheny County Health Department, 2018b). By education level, 5% of individuals without a high school diploma, and 0.6% of individuals with a college degree reported no vegetable intake within the past week.

HP2020 objective PA-1 aims to reduce the percentage of adults who engage in no leisure time physical activity to 32.6% by 2020 in the U.S. (U.S. Department of Health and Human Services, 2019e). In Allegheny County for physical activity, 21.8% of adults reported none within the past month. This percentage was even higher among females at 25%, compared to 19% of males (Allegheny County Health Department, 2018b). This HP2020 goal is not directly related to the metric used in the county since the county looked at physical activity engagement within the past month. However, overall, Allegheny County has met the HP2020 target for reducing the percentage of adults who do not engage in physical activity, even though the county does have a gender-related disparity for physical activity engagement.

The clinical risk factors measured for chronic diseases in Allegheny County were overweight and obesity, high blood pressure, and high cholesterol. HP2020 objective NWS-9 aims to reduce the proportion of adults who are obese to 30.5% by the year 2020 in the U.S. (U.S. Department of Health and Human Services, 2019d). The percentage of adults who are overweight or obese is high throughout all of Allegheny County at 65% overall (Allegheny County Health Department, 2017). The obesity rate is over 50% in each of the 13 County Council Districts in Allegheny County (Allegheny County Health Department, 2018b). Geographically, the areas with the highest percentage of overweight and obesity were in the east and the south parts of the county (Figure 7) (Allegheny County Health Department, 2018b). Racially, the rate for obesity is higher among Blacks compared to Whites. The obesity rate for Blacks is 73% and for Whites is 64%

(Allegheny County Health Department, 2017). Allegheny County is not close to meeting the target for HP2020 objective NWS-9 due to the very high obesity rates in the county.

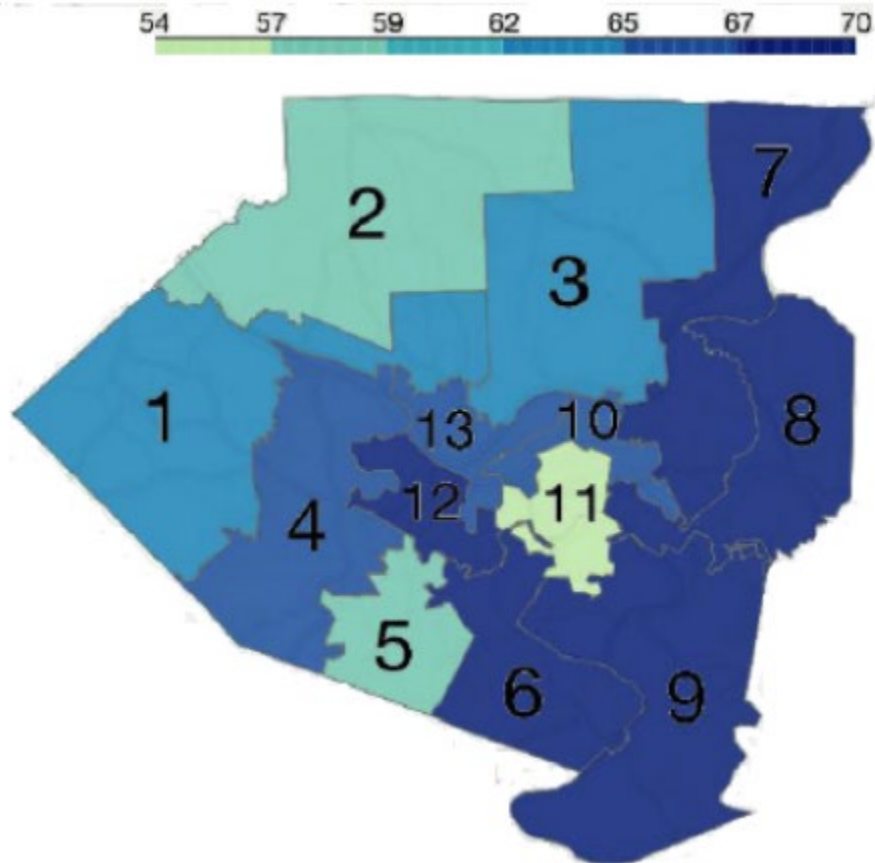


Figure 7 Percentage of Overweight and Obese Adults in Allegheny County, by Council District
(Allegheny County Health Department, 2018b)

For adults aged 18-64 in Allegheny County, 35% have high blood pressure (Allegheny County Health Department, 2018b). Disparities based on education were observed, with 48% of individuals without a high school diploma, compared to 28% of individuals with a college degree having high blood pressure (Allegheny County Health Department, 2018b). There currently is not a HP2020 goal that exists that strictly has a target for rates for high blood pressure without being associated with an already pre-existing chronic disease.

HP2020 objective HDS-7 aims to reduce the proportion of adults with high blood cholesterol levels to 13.5% by the year 2020 (U.S. Department of Health and Human Services, 2019b). Among adults aged 18-64 in Allegheny County, 35% have high cholesterol. Disparities based on income were observed, with 41% of individuals making less than \$15,000, compared to 30% of individuals making more than \$75,000 having high cholesterol (Allegheny County Health Department, 2018b). Allegheny County is not close to meeting this HP2020 target for high cholesterol.

The top chronic diseases identified in Allegheny County were chronic lung disease, diabetes (among those who were tested), angina or heart disease, and cancer (excluding skin cancer). Each of these diseases had observable disparities based on race, income, education, and gender.

Currently there is not a HP2020 goal that focuses on diagnosis of chronic lung disease, so there is not a comparison for this chronic disease. Among adults in Allegheny County, 7.1% reported having chronic lung disease (Allegheny County Health Department, 2018b). By race, 8% of non-Hispanic Blacks and 7% of non-Hispanic Whites reported having chronic lung disease (Allegheny County Health Department, 2018b). By income, 18% of individuals making less than \$15,000 and 2% of individuals making more than \$75,000 reported having chronic lung disease (Allegheny County Health Department, 2018b). By education, 18% of individuals without a high school diploma and 3% of those with a college degree reported having chronic lung disease (Allegheny County Health Department, 2018b). By gender, 9% of females and 5% of males reported having chronic lung disease (Allegheny County Health Department, 2018b). In conclusion, non-Hispanic Blacks, individuals with income less than \$15,000, adults without a high

school diploma, and females have the highest rates of chronic lung disease within Allegheny County (Allegheny County Health Department, 2018b).

HP2020 objective D-1 aims to reduce the annual number of new cases of diabetes among persons aged 18 to 84 years to 7.2 new cases per 1,000 population (or 0.72%) (U.S. Department of Health and Human Services, 2016a). This rate is not directly comparable to the percentages in Allegheny County since the county reported individuals who have ever been diagnosed. Also, the data from Allegheny County considered adults aged 18 to 64, so there is also an age difference. However, among adults in Allegheny County who were tested for diabetes, 9.9% reported having diabetes (Allegheny County Health Department, 2018b). By race, 12% of non-Hispanic Blacks and 10% of non-Hispanic Whites have diabetes (Allegheny County Health Department, 2018b). By income, 16% of individuals making less than \$15,000 and 6% of individuals making more than \$75,000 have diabetes (Allegheny County Health Department, 2018b). By education, 19% of adults without a high school diploma and 6% of adults with a college degree have diabetes (Allegheny County Health Department, 2018b). By gender, 9% of females and 11% of males have diabetes (Allegheny County Health Department, 2018b). Overall, non-Hispanic Blacks, individuals making less than \$15,000, adults without a high school diploma, and males had the highest rates of diabetes within Allegheny County (Allegheny County Health Department, 2018b).

HP2020 does not have a goal that specifically aims to reduce the proportion of adults living with angina or heart disease, so there is not a comparison given for this metric. In Allegheny County, 4.7% of adults reported that they have angina or heart disease (Allegheny County Health Department, 2018b). By race there was no observable difference, with 5% of non-Hispanic Blacks and non-Hispanics Whites who reported having angina or heart disease (Allegheny County Health Department, 2018b). By income, 7% of individuals making less than \$15,000 and 2% of

individuals making more than \$75,000 reported having angina or heart disease (Allegheny County Health Department, 2018b). By education, 9% of adults without a high school diploma and 3% of adults with a college degree reported having angina or heart disease (Allegheny County Health Department, 2018b). By gender, 3% of females and 6% of males reported having angina or heart disease (Allegheny County Health Department, 2018b). Overall, there were no observable differences by race, but individuals making less than \$15,000, adults without a high school diploma, and males had the highest rates of angina and heart disease within Allegheny County (Allegheny County Health Department, 2018b).

There currently is not a HP2020 goal that aims to reduce the proportion of adults who report having a cancer that is not skin cancer. The current cancer-related HP2020 goals are mostly related to reducing the proportion of cancer-related death, increasing cancer screening, cancer counseling and education, and increasing the proportion of individuals who make behavior changes to reduce risk of skin cancers (U.S. Department of Health and Human Services, 2019a). So, there is not a HP2020 comparison metric for cancer. However, among adults living in Allegheny County, 8.1% reported having a cancer that was not skin cancer (Allegheny County Health Department, 2018b). By race, 6% of non-Hispanic Blacks and 9% of non-Hispanic Whites reported having cancer (Allegheny County Health Department, 2018b). By income, 10% of individuals making less than \$15,000 and 6% of individuals making more than \$75,000 reported having cancer (Allegheny County Health Department, 2018b). By education, 8% of adults without a high school diploma and 7% of adults with college degree reported having cancer (Allegheny County Health Department, 2018b). By gender, 10% of females and 7% of males reported having cancer. In conclusion, non-Hispanic Whites, individuals whose income is less than \$15,000, adults

without a high school diploma, and females had the highest rates of cancer within Allegheny County (Allegheny County Health Department, 2018b).

Overall, with the exception of cancer, non-Hispanic Blacks had the highest rates of chronic diseases in Allegheny County. Individuals with income less than \$15,000 and adults without a high school diploma had the highest rates of chronic diseases, and chronic disease rates varied between males and females.

5.0 Social Media Campaign

5.1 Health Equity Briefs

To disseminate the results of the Allegheny County Health Survey to community residents, health equity briefs were created, in collaboration with the University of Pittsburgh Graduate School of Public Health Center for Health Equity, for each of the focus areas: maternal/child health, chronic diseases, access to health care, environmental health, and mental health and substance use disorders. These were also posted on the Allegheny County Health Department's website as a part of the county's "Plan for a Healthier Allegheny" initiative. These briefs are four to six page-long infographics that give insight on the existing health disparities based on race/ethnicity, age, place of residence, and health insurance status related to each of the health focus areas. The briefs also included clear calls to action so that community members can make behavior changes to reduce their risk and promote better health outcomes.

The target audience for these briefs were the general public in Allegheny County. However, to ensure that a larger proportion of the target audience was reached, social media was identified as a route of dissemination, among many others. On social media platforms, such as Facebook and Instagram, short videos will outline ways to prevent poor health outcomes and promote positive health behavior changes.

5.2 Social Media Videos

Maternal and child health and chronic diseases were chosen as topics for the first social media campaign because the project team has expertise in those areas. The Allegheny County Health Department's Maternal and Child Health Program, in collaboration with the Allegheny County Infant Mortality Collaborative had recently hosted the All-for-One Summit to speak about reducing racial disparities related to maternal and child health issues (Government Alliance on Race and Equity, 2018). This summit provided a foundation for the maternal and child health social media campaign, since a network of both experts and residents who could share their personal experiences related to the health topic already existed. Chronic diseases were chosen because the University of Pittsburgh Graduate School of Public Health Center for Health Equity had a REACH grant, focusing on improving the health, specifically chronic disease prevention, of African Americans in Allegheny County. Since this grant was in effect, videos from the social media campaign can be used in accordance with the grant.

For the social media campaign, short videos will be created that explain existing health disparities in Allegheny County associated with maternal/child health and with chronic diseases. Each video will be no longer than two minutes and will include a member of the community speaking about their personal experience with a maternal/child health or chronic disease issue, and an expert addressing the same issue. For the chronic diseases campaign, a community member will speak about their experience living with diabetes. The maternal/child health video will feature a mother who almost died while delivering her child. Each video will discuss health disparities observed within the county and will include a clear call to action for users. The videos will direct users to the Allegheny County Health Department website, so that they can view the health equity briefs that were created for each of the focus areas. Users will also be given advice on how to

reduce their risk for poor maternal/child health outcomes and their risk for developing chronic diseases.

5.3 Goals for the Social Media Campaign

The main objectives for the social media video campaign are to

1. Educate the public about the factors that impact maternal/child health and chronic diseases, including racial/ethnic disparities;
2. Connect viewers to health information and resources to help them reduce and prevent poor maternal/child health and chronic disease outcomes; and
3. Direct users to the Allegheny County Health Department website for additional information.

For the maternal/child health and chronic diseases video campaigns, the videos included an interview of professionals and included client testimonials. The professionals interviewed were from the Allegheny County Health Department, Healthy Start, Inc.-Pittsburgh, and the University of Pittsburgh Graduate School of Public Health. These professionals discussed maternal/child health and chronic disease health disparities and health inequities, the contributing factors to these health disparities and health inequities, and how to reduce these disparities in the county. The professionals for maternal/child health also discussed what is being done to increase mother's intention to breastfeed, as well as resources available to women for prenatal care, such as Women, Infants, and Children (WIC) and home visiting programs. The client testimonials for the maternal/child health video will include a mother who experienced a negative birth or child health

outcome, such as a preterm birth, and is now participating in a home visiting program and how that program and helped.

For the chronic disease video, professionals explained why when compared to Whites, higher rates of chronic diseases such as diabetes, obesity, and heart disease are observed among people of color. Professionals also discussed what the Allegheny County Health Department is doing to address chronic disease health disparities. The client testimonials for the chronic disease video will include someone who has a chronic disease, and any behavior changes they made to manage their disease, which may include increasing their level of physical activity or increasing their fruit and vegetable intake.

Though this paper focused specifically on maternal/child health and chronic diseases, the campaign will eventually create and promote videos for access to health care, environmental health, and mental health and substance use disorders as part of the Plan for a Healthier Allegheny. Once the videos are completed, they will be uploaded to health-focused blogs and several social media platforms, as suggested by Bhattacharya et al. (2017) and Lu and Johnson (2014), including Facebook, Twitter, and Instagram to drive traffic to the Allegheny County Health Department's website.

Each of the videos will be shareable, to maximize the number of people whom the messages reach as suggested by researchers in the Kite et al., (2016) study. The videos will be promoted in collaboration with Motor Mouth Multimedia, the company that produced the videos for the campaign, and other partnering organizations. Each of the videos will have a clear call to action, as suggested by researchers in the Freeman et al., (2015) study, for users to increase the likelihood of a reduction in poor health outcomes. The videos will be uploaded through an online influencer and blogger ambassador program, which will help with targeting specific populations to enhance

the outreach of the campaign. Additionally, the influencers and bloggers will participate in a Facebook Chat to increase user engagement and will personalize messages to help with motivating users to make a positive health behavior change. These influencers and bloggers will already have an established presence in Allegheny County and have a focus on raising awareness about health policies and practice.

In addition to promotion of the videos, the health equity briefs will be condensed. The briefs are currently four to six pages long. These will be shortened to one-page infographics to make the information more reader-friendly. These infographics will be promoted on the Allegheny County Health Department's website under the Plan for a Healthier Allegheny and the videos used for the campaign will also direct users to the infographics.

6.0 Discussion

6.1 Maternal and Child Health in Allegheny County

In Allegheny County, there is a need for improvement of maternal and child health, and a need to increase resource availability. Black infants have higher rates of infant mortality and SUID in Allegheny County compared to White infants. Black infants also have not met the HP2020 targets for infant mortality and SUID, while whites have exceeded the targets for both goals. Early initiation of prenatal care is a way to lower the risk of infant mortality. However, based on the Community Health Assessment, Black mothers are less likely to initiate prenatal care during the first trimester of pregnancy and Black mothers have not met the HP2020 MICH-10.1 objective related to early prenatal care. This suggests a need for Black mothers to initiate prenatal care early in their pregnancy during the first trimester, to help reduce the risk of infant mortality. To ensure that Black mothers are receiving adequate prenatal health information at early stages of their pregnancy, better promotion of healthcare resources such as WIC and home visiting programs needs to be implemented in Allegheny County. Videos uploaded on social media can help with promotion of these resources.

Additionally, the rate of mothers who smoked during pregnancy is high in Allegheny County and is far behind reaching the HP2020 MICH-11.3 objective related to smoking during pregnancy. The rate of cigarette smoking during pregnancy is higher among Black mothers compared to White mothers. This suggests that mothers in Allegheny County need to have access to proper prenatal health education, and this needs to include information about birth outcome risks associated with cigarette smoking during pregnancy. Access to tobacco cessation programs also

needs to be made available to support mothers who plan to quit smoking during or after pregnancy. Using social media to direct users to tobacco cessation programs offered throughout the county can foster the initiative for mothers to quit smoking.

Intention to breastfeed is an important factor for child health. In Allegheny County, intention to breastfeed varies geographically. Women living in communities along the river had lower rates for intention to breastfeed. Most of these communities are low-income, which may play a role. Additionally, black women had the lowest percentages for intention to breastfeed in the county. One factor that may play a role in this is Black mothers are “more likely to return to work earlier after childbirth and are more likely to work in environments that do not support breastfeeding” (James, 2017). This suggests that the county needs to have better promotion of the importance of breastfeeding, as well as resources to help mothers breastfeed after giving birth. Social media can be a tool used to ensure mothers from various geographic areas in Allegheny County can access information about WIC and home visiting programs that promote breastfeeding for mothers. However, the geographic disparities observed among women who intend to breastfeed merit further research.

Low birth weight and preterm births can negatively impact the health of infants. Black infants in Allegheny County were born with low birth weight or preterm at higher rates than other races. Black infants also did not meet the HP2020 targets for low birth weight and preterm births, while White infants met the target for low birth weight and are close to meeting the target for preterm births. It is difficult to determine why this disparity exists, but these racial disparities could be due to higher levels of stress experienced by Black moms due to stress from racism (Kim, Saada, & health, 2013; Masho, Price, Kinser, Jallo, & Practice, 2014). Stress from racism can cause cortisol levels to rise, which can be associated with preterm births (Masho et al., 2014).

Additionally, a study by Russ et al. found that fetuses can have adaptive responses due to their mother's health or physical state (Russ, Larson, Tullis, Halfon, & journal, 2014). For instance, long-term risk of disease can occur among infants who experienced a nutrition-poor intrauterine environment, then experienced a nutrition-rich environment after birth (Russ et al., 2014). This switch in the nutrient levels in the environment creates a greater risk of metabolic syndrome and overweight and obesity later in life, which can also increase risk for poor health outcomes including obesity and diabetes (Russ et al., 2014). Ways to prevent these adverse fetal programming events from occurring are not yet known; further research is necessary for determining how to reduce these risks.

Through the use of a social media video campaign, factors that relate to infant mortality, low birth weight and preterm birth will be discussed. The videos will also include Black women sharing their maternal/child health experiences in Allegheny County, so that the videos are more relatable to the targeted audience. Additionally, the videos will be advertised by Facebook influencers who are active in the Black community in Allegheny County. So, by having more inclusive videos and marketing the videos to the targeted audience by a trusted community member, the health information should be more easily accessed by Black women in the county. The social media campaign can help reduce racial disparities associated with poor maternal/child health outcomes by having more Black women, who are disproportionately affected by these health issues, access the health information and resources discussed in the videos.

6.2 Chronic Diseases in Allegheny County

The Allegheny County Health Survey looked at behavioral risk factors for chronic diseases in Allegheny County. The behavioral risk factors evaluated were smoking, fruit intake, vegetable intake, and physical activity. The percentage of adults who smoke in Allegheny County is high and is even higher among non-Hispanic Blacks. Overall, Allegheny is not even close to meeting the HP2020 TU-1.1 objective for reducing cigarette smoking among adults. Suggesting, efforts need to be focused on tobacco cessation programs to help reduce the rates of cigarette smoking in the county.

Also, adults who make less than \$15,000 were less likely to report fruit intake within the past week compared to adults who make more than \$75,000. Adults without a high school diploma were less likely to report vegetable intake within the past week compared to adults with a college degree. Females were less likely to report engaging in physical activity within the past month compared to males. There were not any directly comparable HP2020 targets for these metrics. However, these data suggest that better targeted campaigns, which can include social media, needed to increase awareness about the behavioral risk factors for chronic diseases, as well as increased access to affordable fruits, vegetables, and places to engage in physical activity.

The Allegheny County Health Survey also looked at clinical risk factors for chronic diseases in Allegheny County. The clinical risk factors evaluated were overweight and obesity, high blood pressure, and high cholesterol. Allegheny County had very high rates of overweight and obesity. Black adults had the highest obesity rate compared to White adults. Geographically, the highest rates of obesity were seen in the east and south parts of the county. Allegheny County has not met the HP2020 NWS-9 objective for reducing rates of obesity. High rates of high blood pressure and high cholesterol among adults aged 18-64 were also observed, with existing education

and income disparities in Allegheny County. Individuals without a high school diploma were more likely to have high blood pressure compared to individuals with a college degree. Adults with an income less than \$15,000 were more likely to have high cholesterol than adults with an income greater than \$75,000. There was not a HP2020 goal directly related to high blood pressure. However, Allegheny County is not close to meeting the HP2020 HDS-7 target for high cholesterol. These data suggest income and education may play a role in mitigating one's clinical risk factors for developing chronic diseases. Messaging in a social media campaign should include resources that are affordable, so that more people in the county can have access. A major resource that the chronic diseases video will highlight is the Live Well Allegheny initiative, which aims to "improve the health and wellness of Allegheny County residents" (Allegheny County Health Department, 2018d). This initiative promotes the use of the county-wide farmer's markets and The Greater Pittsburgh Community Food Bank to help improve access to healthier foods (Allegheny County Health Department, 2018d). The initiative also provides a list of ways residents can maintain a healthy lifestyle for free, such as using local biking and walking trails (Allegheny County Health Department, 2018d).

Chronic lung disease, diabetes (among those who were tested), angina or heart disease, and cancer (excluding skin cancer) were the highlighted chronic diseases for this paper. Notably, there are not HP2020 goals directly related to the way diabetes, angina or heart disease, or cancer rates were assessed in Allegheny County. Among those who reported having chronic lung disease, non-Hispanic Blacks, individuals making less than \$15,000, adults without a high school diploma, and females had the highest rates. Among those who were tested for diabetes and reported having diabetes, non-Hispanic Blacks, individuals making less than \$15,000, adults without a high school diploma, and males had the highest rates. Among those who reported having angina or heart

disease, individuals making less than \$15,000, adults without a high school diploma, and males had the highest rates. There were no observable differences by race for the percentage of adults who reported having angina or heart disease in Allegheny County. Among adults who reported having a cancer that was not skin cancer, non-Hispanic Whites, individuals with an income less than \$15,000, adults without a high school diploma, and females had the highest rates. These data suggest that interventions need to target individuals from all socioeconomic statuses, educational backgrounds, genders, and be inclusive of race.

Not having a high school diploma puts individuals at a much higher risk for developing chronic diseases in Allegheny County. This indicates that targeting social media ads to individuals without a high school diploma is necessary. This is especially important to ensure that all residents have access to accurate health information through the social media campaign. To ensure that the ads are inclusive and relatable, the social media videos and information presented will need to be comprehensible for people with a lower educational background and will also include ethnically diverse individuals.

7.0 Conclusion

The purpose of this paper was to look at social media as a way to disseminate public health information associated with maternal/child health and chronic diseases, in order to influence a behavioral change. Women often times do not have access to adequate prenatal health education or antenatal health services and infants may not get early enough care to ensure the best health outcomes for the mother and the infant. Some of the health conditions that can arise from maternal and child health issues are preterm birth, low-birth weight, maternal mortality, SUID, and infant mortality. Racial/ethnic disparities indicate that Blacks experience these conditions at higher rates than Whites.

Factors that play a role in maternal and child health outcomes are prenatal care, smoking cessation, intent to breastfeed, family planning, healthy birthweight, safe sleep practices, and breastfeeding. Resources that can enhance maternal and child health outcomes include provider availability, social support, and use of home visiting programs. All of these factors can influence positive health outcomes for maternal and child health.

In Allegheny County, chronic lung disease, diabetes, angina or heart disease, and cancer (excluding skin cancer) are highly prevalent. Each of these diseases affect people with lower income and less education at higher rates. Racial/ethnic disparities were also observed, with non-Hispanic Blacks having a higher risk of developing chronic lung disease and diabetes, and non-Hispanic Whites having a higher risk of developing cancer that is not skin cancer in Allegheny County. Furthermore, in Allegheny County, Blacks smoked cigarettes, a risk factor for chronic diseases, at higher rates than Whites, suggesting that they may be at a higher risk for developing chronic diseases.

There were limitations of this project. One of the limitations is that Allegheny County is currently a growing population. Though there is a growing Hispanic and Latino/a population, the videos and the briefs are not currently produced in Spanish. So, there may be some language barriers for residents of the County, which will limit the people that will be reached by the campaign. Additionally, the videos will not be heavily focused on health behavior change theories. They will be motivational but will not be personalized to each user. It is the plan that the Facebook Chat will be more personalized since it will be interactive, to supplement for the generic messaging of the videos.

There are also very diverse populations moving in to the county, especially immigrant populations, which include Somali, Bhutanese, and Nepalese identifying individuals. Specific immigrant populations were not accounted for during the assessment, which is a limitation of the Community Health Assessment.

A limitation for this paper is that the videos for the social media campaign have not been released or promoted yet. Also, residents that do not have access to the internet will not be able to view these videos on social media, which can create a barrier for individuals who may need to access this information the most. Further, though this paper discusses reasons why a video social media campaign is an adequate method for health promotion, evaluation of the effectiveness of this campaign is not yet possible since the videos have yet to be finished. However, when the videos are released and promoted, evaluation of the effectiveness of the campaign will be conducted and will utilize the RE-AIM framework and Google Analytics.

In Allegheny County, proper prenatal health education and availability of resources need to be improved in order to address maternal and child health issues. Racial/ethnic disparities suggest that promotion of this information needs to be inclusive of Black/African Americans since

they experience poor maternal and child health outcomes at higher rates compared to Whites in Allegheny County.

In addition to maternal and child health issues, chronic diseases are also a public health issue that needs to be addressed as they are among the top causes of mortality in the United States. Strategies that can reduce the risk of chronic diseases include physical activity, cessation of cigarette smoking, improving access to healthy and affordable foods that include fruits and vegetables. Diabetes is a common chronic disease in the U.S. and in Allegheny County. Risk factors for diabetes include overweight and obesity, hypertension, heart disease, and cigarette smoking.

Maternal/child health and chronic disease are public health issues that are affecting Allegheny County. To address these issues, social media campaigns can be an effective tool for promoting health education to the community. Social media can target various populations that are affected by these health issues, allowing for more people to access proper health education compared to print health communication campaigns (Kite et al., 2016). The videos created for the social media campaign will be targeted for individuals with lower educational levels, to ensure that they also have access to accurate health education information. All people deserve a healthy life, regardless of the level of education obtained. The social media campaign that will be implemented will inform user of resources in Allegheny County that can help lower their risk for chronic diseases and poor maternal/child health outcomes. Such information will include places that sell affordable fruits and vegetables, smoking cessation program, free and affordable physical activity locations, and home visiting programs. People deserve to have a high quality of life. Informing individuals of ways to stay healthy can reduce the risk of poor health outcomes.

Regardless of race/ethnicity, education level, income, or place of residence, all people deserve access to proper health education and resources.

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