No Cost Dental Care in Exchange for Community Service Hours: Participating Patients' and Dentists' Responses

by

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DEDICATION

I dedicate this thesis work to…

my daughter Selena who is also my best friend. A beautiful, gentle spirit whose constant encouragement, love and support have helped me through more difficult times than she can ever imagine.

my son Steven, whose brilliance, strength and tenacity has encouraged me to keep going, even through adversity.

my parents who are now deceased. Their example of hard work and expression of unconditional love will never be forgotten.

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CHAPTER I

INTRODUCTION

1.1 Problem Statement

Access to oral health care is a challenge for United States (U.S.) citizens at the national, state and local levels.[1] Lack of access to oral health care appears to be more prevalent in inner-city and rural communities, where the patients either cannot afford the proper care, lack transportation, or where dental services are not located in close enough proximity to their homes.[2]

Another major barrier to obtaining oral health care is low or limited oral health literacy.[3] Just as health literacy includes the ability to understand basic health information, oral health literacy is a term used to measure the degree to which individuals are able to utilize information provided to make appropriate decisions regarding their oral health.[4] Unfortunately, a lack of public understanding and awareness still exists regarding the importance of oral health.[5]

According to the Comprehensive Dental Reforms Act of 2012, there are 47 million people who do not have access to regular oral health care.[2] This population includes, but is not limited to indigent children and adults, those with special health care needs, the elderly, the homebound, nursing home residents, the uninsured and

underserved rural residents, and racial and ethnic minorities.[6] However, the main reasons reported for not seeing a dentist were financial.[7]

When considering access to dental care among different age groups, non-elderly adults with low incomes (defined as less than 133 % of the Federal Poverty Level) experience the greatest financial barriers to oral health care.[7] Programs initiated in recent years have made dental care more accessible for children. However, while the gap in dental care use between high-income and low-income children has become narrower, the gap that exists for dental care utilization between high-income and low-income adults has widened.[8]

As a result of the financial barrier to appropriate oral health care, low income adults tend to put care off until pain or infection make a hospital emergency room visit inevitable.[9] Hospital emergency rooms are ill-equipped to handle most dental problems. Frequently, the patient is given a prescription for antibiotics and/or pain medication and instructed to see their dentist.[10] Because the patient has neither dental insurance nor a dental home, they often times return to the ER with their initial dental problem unresolved, resulting in a vicious cycle of additional ER visits and skyrocketing costs.[10]

Oral health is strongly related to overall quality of life.[11] Poor oral health can cause pain, loss of function, emotional anxiety, and social disadvantages and can affect school or work attendance.[11] Economic productivity is affected by poor work attendance as a result of poor oral health.[12] Furthermore, many studies have found associations between oral infection and systemic disease. Some of the systemic conditions related to poor oral health include osteoporosis,[13] pulmonary infections,[13] diabetes,[13,14,15] cardiovascular disease,[13,14,15] and preterm low birth weight.[14,15] Negative health

outcomes associated with a lack of dental care can be life threatening.[15] These possible outcomes underscore the need for access to oral health care for underserved individuals.

Many different initiatives are underway to help reduce the disparities that exist in access to oral health care for underserved patients. One fairly recent approach has been developed by Care Free Medical and Dental, a mid-Michigan nonprofit organization that serves 7000+ patients without insurance or without access to affordable health care.[16] Care Free provides medical, optometry, behavioral health, substance abuse services and dental care.[16] Their "Pay It Forward Dental Program" (PIF) is a partnership between Care Free and the Central District Dental Society of Michigan.[17] The objective of this program is to help low-income, non-elderly adult patients living in mid-Michigan that have an unmet need for dental treatment to gain access to dental care services.[17]

Care Free has been tracking the number of patients, volunteer hours, services rendered by the volunteer dentists, and the dollar value of treatment provided. However, no formal assessment of the perceptions of either the volunteer dentists or patients who participate in this program has been conducted until now. This thesis therefore focuses on this aspect of the program because it is beneficial to gain an understanding of this program from the patients' and the dentists' viewpoint.

1.2 Goal Statement

The goal of this study was to gain an understanding of how the participating patients and volunteer dentists perceive the Care Free Dental's PIF Program. Patients'

attitudes towards their volunteering experience, along with their satisfaction with the dental treatment and the program overall were assessed. Likewise, the dentists' attitudes towards their volunteering experience and their perceptions of the strengths/weaknesses of the program were also determined as one way to measure the program's overall success. The results of this study will provide a basis to reevaluate how this program was designed and implemented, and will hopefully aid other communities in establishing similar programs, thus contributing to increased access to dental care.

An assessment of how the participating patients' improved oral health affects their oral health-related quality of life is also a goal of this study. Further, exploration of the socio-demographic characteristics of patients who registered for the PIF program but did not follow through were compared with those of patients who received care through the PIF program.

1.3 Specific Aims

Specific Aim 1: To assess the participating patients' motivation, attitudes and perceptions of the Pay It Forward Dental Program as well as their experiences with this program.

Hypothesis: The patients who participate in the Pay It Forward program will find their volunteering experiences to be positive and worthwhile, and perceive their dental treatment as valuable and important.

Specific Aim 2: To assess how the improved dental health of patients who received care affects their oral health-related quality of life.

Hypothesis: The Pay It Forward patients' improved dental health will positively affect their oral health-related quality of life.

Specific Aim 3: To compare the socio-demographic characteristics of patients who registered but did not follow through with program participation with the characteristics of patients who received care through the Pay It Forward Program.

Hypothesis: Older patients (over 60 years of age), patients with higher household incomes, and those that live a greater distance from Care Free Dental Clinic will be less likely to follow through with the program.

Specific Aim 4: To evaluate the participating dentists' motivation, attitudes and perceptions of the strengths and weaknesses of the Pay It Forward Dental Program and their experiences with this program.

Hypothesis: The dentists who volunteer in the Pay It Forward program will find their interaction with patients to be rewarding, and the care provided to the patients to be valuable.

1.4 Significance

To the author's knowledge, there have been no previous studies conducted concerning the attitudes and perceptions of either dentists or patients who participate in a program where patients volunteer in exchange for dental treatment. Additionally, there were no existing preliminary studies found relating to patients' perceived oral health-related quality of life when participating in this type of program. Furthermore, no research could be located concerning the socio-demographic characteristics of patients

who follow through with participation in such a program, and those who register but do not follow through. Knowledge gained from this study will aid PIF program collaborators in determining the success of their program as well as provide a basis for making improvements. Moreover, valuable information relating to whether this type of program may improve the oral health-related quality of life of patients will be gained. Also, this study will contribute to an increased understanding of the differences in socio-demographic characteristics of participants who follow through with treatment vs. those who do not.

1.5 Thesis Overview

In Chapter II, the Review of the Literature, an overview of the importance of oral health, the relationship between oral health and oral health-related quality of life and overall health will be provided, along with a description of the many barriers that exist to accessing oral health care. The gaps in current research are examined, in addition to an analysis of the significance of program evaluations and survey research. Chapter III will cover Materials and Methods. Chapter IV deals with the Results of the study, followed by a Discussion in Chapter V, and lastly Conclusions in Chapter VI.

CHAPTER II

REVIEW OF THE LITERATURE

2.1 Access to Oral Health Care Services - An Overview

Unfortunately, a significant portion of the U.S. population lacks access to oral health care.[5] Currently, over 108 million U.S. citizens including adults and children lack dental insurance.[18] There are 2.5 times more U.S. citizens who lack dental insurance than those who lack medical insurance.[18] Further, 59.81% of the populations' dental needs are currently **not** being met.[19] This lack of oral health care access is a problem that requires new, innovative solutions.

This study focuses on a new, innovative program that addresses the issue of access to dental care. The Care Free Pay It Forward (PIF) Dental Program is a partnership between Care Free, a non-profit medical and dental clinic, and the Central District Dental Society of Michigan.[16,17] Together they are providing oral health care to underserved adults in Ingham County, MI, and surrounding areas.

The following literature review will describe the PIF program, and the importance of oral health for patients' overall health and quality of life. In addition, it will discuss the problems that are created by a lack of access to oral healthcare. Further, factors that contribute to a lack of access are considered as well, including Dental Health Professional Shortage Areas, limited acceptance of Medicaid by dentists, limited scope

of practice of dental hygienists, low health literacy, and cultural and language, location, transportation and financial barriers.

2.2 Importance of Oral Health

Oral health is a broad term that encompasses not only the teeth, but all of their supporting hard and soft tissues.[5] Prior to World War II (WWII), there was little emphasis put on preventive oral health care services.[5] Because of this, most adults did not retain their teeth past middle age.[5] Early tooth loss, oral diseases and infections were found to adversely affect patients' quality of life.[5]

However, post WWII, research about disease prevention and the promotion of health and healthy lifestyles began to flourish.[5] This research uncovered the fact that the health of the oral cavity is a reflection of one's general health and well-being.[5] However, it was the release of the first ever U.S. Surgeon General's report on oral health in 2000 that brought this issue to the forefront.[5] Since then, steps have been made to integrate oral health as an essential component of general health care.[5]

In recent years, studies showed that periodontal disease may have widespread systemic effects.[15] These systemic effects are associated mostly with chronic conditions, such as diabetes, cardiovascular disease, respiratory infections, osteoporosis, and pregnancy complications; the connection between these systemic diseases and periodontal disease is inflammation.[15] For example, chronic Diabetes Mellitus consists of two main types: Insulin dependent (Type I), and non-insulin dependent (Type II), the latter of which comprises at least 90% of diabetes cases.[20] Diabetes can exacerbate periodontal disease by increasing oxidative stress.[20] However,

the reduction of HbA1C by periodontal treatment may play a role in controlling diabetes, implying an effect of periodontal disease on diabetes, presumably through inflammatory processes.[20]

Likewise there is evidence suggesting an association between vascular disease, specifically inflammation of the cardiovascular system, and periodontal disease.[20] Transient bacteremia associated with periodontal disease can induce platelet aggregation, which may play a role in blood clot formation in the vascular lining, causing health events such as heart attack and stroke.[21]

In the case of respiratory infections, dental plaque containing a high bacterial load may be a risk factor in institutionalized and elderly individuals who have poor oral hygiene, with direct exposure of the respiratory system to oral pathogens through aspiration.[21] In addition, periodontal disease may be linked to osteoporosis.[21] By modulating host response, periodontal disease increases the local production of cytokines, which in turn may accelerate the resorption of systemic bone.[21]

Lastly, periodontitis exposure during pregnancy has been associated with complications such as pre-eclampsia, per-term birth, and low birth weight.[22] All of these possible systemic associations with periodontal disease make it a reasonable assumption that improved oral health can contribute to better general health of adults and children alike.

2.3 Dental Health Professional Shortage Areas

Access to oral health care is a challenge at the national, state and local levels.[1] A system designating Health Professional Shortage Areas (HPSAs), specifically dental

shortage areas, has been developed to address this problem. The determination of a Dental HPSA (DHPSA) is complex and is defined by either a geographic area, a population group or a facility.[23] The main requirements that qualify for a DHPSA designation for a geographic area are that there must be a population to full-time dentist or equivalent ratio of 5,000 to 1 or higher. For a population group, there must be access barriers preventing the population from using the dental providers in an area, or have a population of at least 4,000 and a population to full-time dentist ratio of 4,000 to 1 or higher .[23] For a facility, it must be either a State or Federal correctional facility with at least 250 inmates and a population to dentist ratio of at least 1,500 patients to 1 dentist; or a non-profit medical/dental facility which has an insufficient capacity to meet the dental needs of that population or area.[23] Figure 1 depicts the DHPSAs by county in the U.S.,[24] and Figure 2 depicts DHPSAs in Michigan,[25] respectively.

In 2014, there were 4,878 total designations for DHPSA's in the U.S.[19] There would have to be an additional 7,208 dental professionals in these areas in order to eliminate all U.S. DHPSA designations.[19] In looking strictly at the dental needs of Michigan residents, 58.21% of their dental needs are currently **not** being met.[19] As of 2014, there were 212 DHPSAs designated in the state, ranking Michigan as 4th behind California at 341, Texas at 240 and Florida at 220.[19] Michigan would need an additional 128 dentists in order to remove all DHPSA designations.[19] Figure 3 shows additional oral health-related information for Ingham County, Michigan, which is the location of the Care Free PIF Dental Program.[26]

2.4 Dental Hygienists and Access to Care

One solution that could address this growing demand for oral health care is the utilization of dental hygienists to provide care to vulnerable and underserved populations.[27] As of 2013, dental hygienists outnumbered dentists by 20% in the U.S.[25] Thirty-seven states have already begun to utilize the skills, knowledge and training of dental hygienists by allowing them to operate under direct access.[25] Direct access models vary by state. In 37 states, the hygienist does not need authorization by a dentist in order to initiate services within their scope of practice.[25] In some states, such as California and Massachusetts, the dental hygienist is required to have a formal written agreement with a dentist and carry their own liability insurance. Some states also may require additional education, such as California's Registered Dental Hygienist in Alternative Practice (RDHAP) or Minnesota's Advanced Dental Therapist models.[25]

In Michigan, the Public Act (PA) 161 Program has allowed dental hygienists to provide direct access preventive services to underserved populations in a variety of settings such as schools, long-term care facilities, and homes for persons with developmental disabilities.[28] In 2013, Michigan had 51 such programs with 192 Registered Dental Hygienists and 92 supervising dentists.[29] These programs allowed for 5,225 adults and 29,626 children to be screened, with 16,792 being referred to dentists for further care.[29] In 2013, 25,382 applications of fluoride varnish were given in addition to dental sealants for 6,209 children.[29] As of 2014, Michigan was one of 16 states that allows direct reimbursement by Medicaid to dental hygienists. Figure 4 represents a map of the states that allow dental hygienists to work under direct access, and the states that allow direct reimbursement by Medicaid to dental hygienists.[30]

2.5 Limited Acceptance of Medicaid by Dentists

Another barrier for underserved populations gaining access to oral health care is the limited acceptance of Medicaid by dentists.[31] Patients covered by Medicaid are disproportionately from minority backgrounds.[28] A recent study of Wisconsin dentists showed that racial/ethnic minority dentists were twice as likely to accept new Medicaid patients as their white counterparts.[31] However, dentists from racial/ethnic minority backgrounds only made up 5% of the total dental workforce in that state.[31]

While private practice dentists provide dental treatment, they may not be a viable treatment source for uninsured and low-income individuals. Many dentists are reluctant to treat Medicaid patients due to issues such as high administrative burden, low reimbursement rates and high incidence of no-shows or broken appointments.[26] Delayed reimbursement is a concern for those dentists that do treat Medicaid patients.[26] In addition, only three out of 10 dentists provide pro-bono care in their practices.[26]

Furthermore, a study that analyzed the open-ended interview responses of 34 dentists, administrators, educators and officials of U.S. and Canadian public health programs identified that dentists' attitudes, dominated by financial concerns and favoring of wealthier patients over those without dental insurance, can have a negative impact on access to care.[32] Some responders placed blame on the government for ridiculously low Medicaid reimbursement rates.[32]

2.6 Barriers to Care - Health Literacy and Oral Health Literacy

Another key barrier to accessing oral health care may be an individual's oral health literacy limitations. Health literacy is the capacity to understand basic health

information, such as medical and educational brochures, appointment slips, consent forms, doctors' directions and instructions on prescription bottles.[4] Forty-three percent of the U.S. adult population have low health literacy skills, which are especially crucial for chronic disease management.[4] Those with lower health literacy have a lesser understanding of self-care instructions, health maintenance and prevention. In addition, they tend to have poorer health than those with higher health literacy.[4]

O*ral* health literacy refers to the ability to obtain, process and understand information pertaining to oral health.[4] In a recent cross-sectional study by Wehmeyer et al., focusing on the impact of health literacy on periodontal health, approximately one-third of the participants were found to have low oral health literacy.[4] Although more severe periodontal disease was associated with lower health literacy, the study participants had a high level of education, which indicates that low oral health literacy was not significantly associated with level of education.[4] Recommendations for reducing this barrier include creating descriptions of patient information using simple graphics, and assessing the readability of documents such as informed consent and patient education materials.[4]

2.7 Barriers to Access to Care – Geographic Location

A study by Walker et al. identifies patient location of residence to be a barrier to accessing oral health care.[33] While urban patients were significantly less likely to have dental visits than rural patients, rural patients were more likely to visit the hospital emergency room with dental caries-related problems.[33] This study indicates that more efforts are needed to connect patients with appropriate dental safety net providers such as Federally Qualified Health Centers, Community Health Centers and dental schools

when geographically feasible.[33] Moreover, collaborations between safety net dental providers, social workers, public hospitals and physicians may be able to increase the perceived value of oral health care in vulnerable populations.[33]

2.8 Cultural and Language Barriers to Care

Cultural and language barriers are also factors related to lack of access to oral health care. Minorities tend to experience disease and disability more often than non-minorities.[34] However, high costs, lack of insurance and limited access to oral health care are not the only reasons that minorities neglect having their preventive and restorative needs met.[34] A lack of communication between patient and provider, competing medical needs and fear or mistrust of providers can prevent these populations from receiving needed care.[34] In order to increase access to oral health care for culturally diverse populations, health care providers must attempt to become culturally competent by being skilled in understanding and communicating effectively with those from different backgrounds.[34]

A study by Shi et al. examined access to health care for racial/ethnic minorities.[35] Nationally representative data from the 2004 Medical Expenditure Panel Survey (MEPS) on 34,403 individuals were analyzed. Even after controlling for insurance status and income, blacks and Hispanics were more likely than whites to report not having seen a dentist or medical doctor in the previous year.[35] In another study by Shelley et al., ethnic disparities of self-reported oral health status in a large urban city were explored.[36] The results showed that compared to all other racial/ethnic groups, non-Hispanic white respondents reported higher dental care utilization, better dental health and higher satisfaction with dental care.[36] Among older patients from minority

backgrounds, Chinese immigrants had the poorest dental health, least satisfaction with dental care and least dental care utilization.[36] With an increasingly diverse U.S. population, more emphasis is needed on increasing the diversity of the dental workforce, which is the least diverse out of all the health care professions.[36]

In a study by Traylor et al., predictors of physician-patient race/ethnicity concordance were examined.[37] The study utilized data from the 2005 Kaiser Permanente's (KP) Diabetes Registry of Northern California and consisted of 109,745 patients and 1,750 physicians. Logistic regression analyses were used to predict racial/ethnic concordance for each group.[37] Primary explanatory variables were whether a patient chose their own physician, availability of a same race/ethnicity physician, and language of the patient. The study concluded that patients were more likely to have a physician of the same race if they were allowed to choose.[37]

2.9 Barriers to Care - Transportation

Many dentally underserved people lack transportation.[38] A study by Smith et al. examined the distance traveled by underserved populations to receive health care services.[38] Medically Underserved Areas (MUAs) and Health Provider Shortage Areas (HPSAs) focus on the ratios of provider to population, and geography and population density are the focus of rural designations. In this study, the authors identified that these areas can be classified in several ways. With all of the different criteria used to designate MUAs, HPSAs and rural areas, it might be simpler to use distance traveled to receive health care, in place of the three types of designations above, to assess need.[38] Possible strategies to address the issue of transportation include providing gasoline vouchers for those living in rural areas, or to incorporate a token system with public

transportation to allow Medicaid recipients in more highly populated areas greater mobility when seeking dental treatment.[38]

2.10 Financial Barriers to Care

The greatest barrier by far to accessing dental care is financial.[7] The American Dental Associations' (ADA) Health Policy Institute conducted research on the oral health of adults. The results showed that not only was finance the greatest barrier, but financial barriers for dental care were greater than those for other areas of health care.[7] In addition, in programs like Medicaid, Children's Health Insurance Program (CHIP) and Healthy Kids Dental, dental utilization rate among underserved children has increased from 2003 to 2011.[7] However, non-elderly, low-income adults continue to face high levels of financial barriers, which lowers dental utilization for that age group.[7]

In a cross-sectional study by Shi et al., the effect of income on accessing dental care was studied. Those reporting the most difficulty accessing dental care had household incomes of less than $20,000 per year.[35] Another cross-sectional study by Steele et al. which studied clinical oral health related to socio-economic inequalities concluded that there is evidence of a socio-economic gradient, with oral health showing an incremental reduction going from richest to poorest.[9] In other words, the wealthiest members of the population are receiving the most dental care and the poorest, the least.

A report by the American Dental Education Association Policy Center titled *Examining America's Dental Safety Net*, showed that adults are prone to three times more untreated dental needs if their income falls below 100% of the Federal Poverty

Level.[18] In a cross-sectional study by Davis & Ballreich, the U.S. was ranked along with 11 other high-income countries for a lack of access to health care.[3] The evidence supports that U.S. citizens encounter higher rates of financial barriers than other industrialized countries.[3] Furthermore, the U.S. experiences greater inequity between lower-income and higher-income adults accessing health care compared to other countries.[3]

Although children are included in Medicaid dental benefits, unfortunately most states only cover emergency dental care for adults and that coverage is optional depending on the state.[18] More needs to be done at the national level to allow access to oral health care for low-income adults.

2.11 Barriers to Care - Low Socio-Economic Status Adults and Children

Individuals who lack access to oral healthcare tend to have poorer oral health.[9] In the same study cited earlier by Steele et al., oral health inequities were examined related to age, lower occupational class, lower income, lower educational attainment or lack of access to care. The results indicated that these characteristics had significant relationships with the poorest clinical outcomes.[9] A review by Schwendicke et al., assessed the association between caries and socio-economic position.[39] Of the 92 studies included in this analysis, 83 found that patients with a low socio-economic status had at least one caries measurement significantly higher than patients with a higher socio-economic status, as opposed to only three studies finding the opposite. As a result, a significantly greater risk of caries experience was associated with lower socio-economic position.[39]

2.12 Barriers to Care - Special Health Care Needs

Another population group experiencing challenges with accessing oral health care are patients with special health care needs. Survey research showed that the majority of general dentists,[40] as well as endodontists,[41] orthodontists[42] and periodontists[43] responded that that their educational experiences had not prepared them well for treating patients with developmental disabilities or special health care needs. Given that their actual attitudes concerning providing treatment for patients with special health care needs as well as their actual behavior were significantly correlated with the quality of their education, it is crucial to improve education of dental care providers to increase access to care for these patients.

2.13 Other Challenges with Access to Care

Although the homebound and those in extended care facilities may not be physically able to participate in a PIF Program, they are among those patients with access to care challenges. The aging of the United States population due to longer life expectancy brings with it an increase in the number of older adults that have retained their teeth.[7] In a cross-sectional study by Ornstein et al., the unmet oral health care needs of elderly homebound adults was assessed.[44] Of the 125 subjects, 96% reported that since becoming homebound, no dental professional had ever visited their home.[44] Oral health problems of this vulnerable elderly homebound population can potentially exacerbate a number of comorbidities they may already be experiencing such as heart disease, diabetes, dementia, cancer or kidney or liver disease.[44]

Nursing home or extended care facility residents are among those who lack adequate oral health care. The bacteria from gingivitis or periodontitis resulting from a lack of oral care have been associated with lower respiratory tract infections.[45] Pneumonia accounts for 13-48% of infections in extended care facilities, and is the leading cause of death for its residents, with mortality rates up to 55%.[45] In addition to inadequate oral health care training, there is usually no specific personnel designated to perform oral care.[45] However, if there is, non-compliance by the caregiver can sometimes be an issue.[45] Hence there is an urgent need for improved oral health care for institutionalized individuals not only for the purpose of oral hygiene services, but for restorative and prosthetic care as well.

2.14 Barriers to Care – Lack of Dental Insurance

People without commercial dental insurance also face barriers to accessing oral health care.[35] In a cross-sectional study by Shi et al., those without dental insurance as compared to those with private insurance had 3.5 times higher odds of not being able to access dental care.[35] In addition, both Medicaid-insured and uninsured individuals were less likely to have had dental visits compared to those with private dental insurance.[35]

In a cross-sectional study by Walker et al., the utilization of hospital emergency departments for dental care in the U.S. was examined.[33] This study found that privately insured individuals were less likely to visit the hospital emergency department for dental care than those without insurance or those with public/government insurance such as Medicaid.[33]

2.15 Barriers to Care - Rural or Inner City Locations

In the same study, it was identified that urban patients were significantly less likely to visit the hospital emergency department for dental related problems compared with rurally located patients.[33] In the U.S., there are 49 million people who live in dental Health Professional Shortage Areas (HPSA's). The Rural Health Clinic (RHC) Services Act was created to increase health services for rurally located Medicare and Medicaid patients.[19] However, it is not a requirement of RHCs to provide preventive dental services.[19] Sixty percent of all rural U.S. counties are governor-certified shortage areas (authorized under federal Rural Health Clinic legislation and established as underserved for primary care) or Medically Underserved Areas (MUAs).[6] Further efforts such as modifying the scope of practice of dental hygienists, introducing mid-level providers or providing financial incentives for dentists willing to practice in the shortage areas are necessary to address the rural workforce shortages.[33]

2.16 Barriers to Care - Racial and Ethnic Minorities

Racial and ethnic minorities face health and oral health disparities. As the U.S. population continues to become more diverse, over one-third of the population consists of Native American, Asian, African American and Hispanic minorities.[34] Unfortunately, minorities are disproportionately affected by disease.[34] Barriers to accessing care partially explain the higher disease rates.[34] In an article by Rereddy et al., a cross-sectional study was conducted in order to analyze the relationship between oral health provider access and the incidence of head and neck cancer in a large Atlanta, Georgia public urban hospital.[46] Zip codes were used to map associations between increased disease prevalence and provider shortages.[46] The results of the study showed that

higher disease prevalence of head and neck cancer and fewer health care providers occurred in zip codes of low-income minority communities, predominantly African American.[46] The study supports disparities being influenced by both demographics and geography.[46]

Another study by Garfinkle et al., examined the dental education of periodontists to determine how well prepared they were to treat underserved patients, such as minorities and those with special health care needs.[43] In addition, their professional attitudes, behaviors and confidence while treating these patients were explored, and whether their attitudes, confidence and behaviors were related to their educational experiences.[43] Results showed that educational experience was correlated with attitudes, confidence and behaviors.[43] The study pointed out however, that attitudes of periodontists and periodontal residents toward treating underserved racial/ethnic minority patients was positive, which may reflect evolving U.S. culture.[43]

2.17 Oral Health-Related Quality of Life (OHRQoL)

A lack of oral health care can result in poor oral health, which in turn can affect many aspects of a persons' quality of life. According to Inglehart et al., "It is suggested that health-related quality of life be defined as a persons' assessment of how the following types of factors affect his or her well-being: (1) functional factors; (2) psychologic factors (3) social factors (such as interactions with others); and (4) the experience of pain/discomfort. When these considerations center around orofacial concerns, oral health-related quality of life is assessed."[47] Quality of Life is recognized by the World Health Organization as a valid assessment measurement for health,

including oral health.[11] Oral health-related quality of life allows the efficacy of treatment protocols to be assessed or evaluated from the perspective of the patient.[47]

Oral health-related quality of life can be included in survey research to examine population-based needs assessment and trends in oral health.[11] Some of the problems associated with a lack of oral health care include, but are not limited to: pain, loss of function, malnutrition, emotional anxiety, social disadvantages, career disadvantages and economic productivity.[11] By expanding the focus from only the oral cavity to the whole person, the inclusion of oral health-related quality of life can contribute to dental research.[47]

In a descriptive-retrospective study by Olmstead et al., quality of care and quality of life were measured for families in Wisconsin who received care in public health departments by dental hygienists to see if oral health was improved for families with cultural differences and economic disparities.[48] Dental hygienists provided 2,364 children with oral health education, 1,745 with oral screenings, 1,511 with dental sealants and 804 were referred to a dentist for follow-up care.[48] The Population Health Institutes' Annual Quality of Life Rankings were used to determine quality of life.[48] The study concluded that the quality of life improved gradually for the individuals studied from 2004 to 2009.[48] These results imply that improved oral health may also improve overall quality of life.

In a before and after study by Hyde et al., 377 adult California welfare recipients who needed extraordinary dental treatment were examined.[12] The participants completed surveys evaluating their oral health-related quality of life both before and after receiving rehabilitative dental treatment, including extractions, dentures,

restorations and scaling and root planing.[12] After completion of dental treatment there was an improvement in oral health and oral health-related quality of life for 79% of those studied.[12] In addition, employment outcomes improved, which in turn, improved economic productivity for California welfare recipients.[12]

2.18 Emergency Department Hospital Visits and Associated Financial Burden

Continuing a multi-year trend, in 2012 dental care utilization declined among working-age adults, and was the lowest it has been since 1996.[8] In fact, according to the ADA, working adults are the age group most likely to have financial difficulty with obtaining dental treatment.[33]

In a cross-sectional study by Walker et al., data were used from the 2008 National Emergency Department Sample (NEDS) to examine the use of hospital emergency departments for dental non-emergencies with a principal diagnosis of dental caries among the uninsured and rural populations.[33] The study confirmed that patients who visited the emergency department for non-traumatic dental conditions were more likely to live in a rural location, live in the Southern U.S., be under the age of 43, be male, earn below $38,999 annually and to be self-pay/uninsured or government insured.[33]

In another study by Davis et al., the cost over a one year period for incomplete dental treatment in the emergency departments of five major Minneapolis-St. Paul hospitals was examined.[49] The results of this study showed that nearly $5 million dollars in charges were attributed to over 10,000 dental related emergency department visits.[49] In addition there was a high frequency of repeat visits, which indicated that while acute

infection and/or pain were treated by physicians of the emergency departments, often times resolution of the initial underlying dental problem was not achieved.[49] Furthermore, in an attempt to compare these results with a population possessing dental insurance, similar data were obtained from a large group employer and from two county-purchased health plans. In contrast, these populations rarely visited hospital emergency departments for dental-related problems.[49]

In a report commissioned by Delta Dental of Michigan, the costs of dental related emergency department visits were reviewed.[50] The Michigan Department of Community Health and the Medical Expenditure Panel Survey (MEPS) were the two primary sources of information.[50] It was determined that in 2011, there were over 7,000 visits to the ER for preventable dental conditions in Michigan.[50] One thousand of these visits required hospitalization.[50] Directly related to these ER visits was an estimated $58 million in charges.[50] However, total payments for these services made by patients and insurers was approximately $15 million.[50] The average cost for one single avoidable hospitalization is estimated to be $12,448.[50] Because most physicians and hospital staff are not trained to treat dental problems, the care received does not solve the underlying problem. Instead, palliative treatment for temporary relief is typically provided in the form of prescriptions for pain medications and/or antibiotics for infection.[50]

2.19 Oral Health Status of Michigan Residents

According to the Michigan Department of Health and Human Services, as of 2008, there were an estimated 10,003,442 people living in Michigan.[51] At that time, 71% had dental insurance.[51] Nearly 1 in 5 residents of Michigan were enrolled in Medicaid.[26]

(this figure includes children). However, 15.6% of Michigan residents did not receive dental care in the previous 12 months due to cost.[51]

Unfortunately there are few statistics available on the current oral health status of Michigan adults. Most available information is about children's oral health. However, available information about adults' oral health shows that 66% of adults aged 35-44 reported no tooth loss, and 17% of those aged 65-74 year old adults were completely edentulous.[51] In addition, there were 2.5 cases of oral cancer mortality per 100,000 persons.[51] Approximately 40% of oral cancer diagnoses were detected at the earliest stages.[51] The percentage of Michigan residents who had not seen a dentist in the year 2007 were highest for the adults aged 25-34 at 30.1%.[51]

This research project involves a community dental program located in Ingham County Michigan. As of 2013, the population of Ingham County was 277,633 residents with 44,909 of those residents (18%) living in poverty.[26] Nineteen percent or 52,617 were enrolled in Medicaid.[26] There was an unemployment rate of 7.2% and 35,220 residents (13%) were uninsured.[26] The median household income was $45,987.[26]

In 2011 there were 63 Ingham county residents who were admitted into the hospital for teeth and jaw disorders, averaging 2.7 days length of hospital stay.[26] The average cost per patient for these hospital stays was $19,339, with a total cost of $1,218,357.[26]

2.20 Overview of Programs that Address Access to Oral Health Care in Michigan

The goal of a community health center is to provide high quality comprehensive health services to residents in urban and rural medically underserved areas.[26] Currently

27 community health centers in Michigan provide dental services at 57 different delivery sites[26] Another source of dental services for uninsured or low-income adults are free and charitable clinics.[27] An example of this is the Care Free Clinic.[16] These clinics primarily utilize volunteers to provide services. In addition, these organizations are 501(c)(3) tax-exempt health care safety-net organizations providing care regardless of patients' ability to pay.[26] Local health departments also provide dental care. Of the 83 Michigan Counties, there are 45 local health departments that service not only their own county, but also surrounding counties that do not have a health department.[26] Nineteen of these health departments provide dental services to their patients.[26]

The two schools of dentistry in Michigan are also contributing to filling the need for oral health care with their community outreach programs.[26] Students help to provide oral health care to low-income and underserved populations throughout Michigan as part of their education.[26] In addition to the outreach programs, the dental school clinics are also available to the public at fees that are typically 30% to 50% lower than those in traditional private practice.[26] These clinics also accept Medicaid in addition to most other dental insurance plans.[26]

In addition to the two dental schools which both house dental hygiene programs, there are 11 other colleges and universities in Michigan that have entry level dental hygiene programs.[52] In 2013, there were 7,211 students enrolled in entry level dental hygiene programs in the U.S.[52] From 1990 to 2014, there was a 65.8% increase in dental hygiene programs across the U.S., compared to only a 16.1% increase in dental programs for that same time period.[52]

Michigan Community Dental Clinics (MCDC), established in 2006, is a not-for-profit corporation that serves over 90,000 individuals statewide, primarily in northern Michigan.[26] By encouraging cost control, efficiency and productivity, they are able to utilize state-of-the-art equipment while providing care to low-income or uninsured individuals.[26] Any surplus funds generated are used to supplement payment for care based on income.[26] Both public health clinics and private practitioners participate in MCDC at 22 sites across Michigan.[26]

There are 12 federally recognized tribes of Native American Communities in Michigan as well as 36,196 federally recognized Native Americans who reside in this state.[26] These tribes are self-governing and operate 13 tribal centers that provide comprehensive health care to Native Americans.[26] Of these, only four provide dental services.[26]

2.21 Unique Dental Programs in Michigan Requiring Patient Volunteering Contributions

Some programs in Michigan designed to provide dental care for patients from low income backgrounds require their patients to contribute volunteer hours as a type of payment for the dental services they receive. The first program of this kind was the Calhoun County Dentists' Partnership in southern Michigan, which started in early 2007.[53] This program is a collaboration of local dentists, free clinics, health-related non-profit organizations, local hospitals and a Federally Qualified Health Center.[53] These groups all work together toward the common goal of helping to meet the dental needs of the uninsured patients in their community.[53]

Dentists who participate, volunteer their time, and work from their own practices.[53] They may deduct the cost of supplies from their taxes, but not the cost of their services.[53] There are 45 volunteer dentists who see approximately 50 patients per week.[54] Patients must first be screened to find out if they qualify for the program financially.[53] Eligible patients may not exceed an income of 200% of the Federal Poverty Level. In addition, they must not be eligible for Medicaid.[53] If potential patients are found to be eligible for Medicaid coverage, they are referred to a Federally Qualified Health Center in the local area.[53]

If they are found to be eligible for the Calhoun County Dentists' Partnership, the next step is to complete a two-hour oral health class.[53] The patient must then begin to accrue community volunteer hours. Four volunteer hours are worth $100 in treatment.[51] Fees are determined by the Dentists' Partnership.[54] The patient receives a volunteer tracking sheet that must be signed by a responsible individual who also indicates the number of hours worked.[55] Four initial volunteer hours would cover the next step of a screening, x-rays and prophylaxis by a staff dental hygienist at Community Healthcare Connections (CHC), which is a Calhoun County non-profit organization that administers the program.[55] Scaling and root planing would also be performed by the staff hygienist of CHC, with the required number of volunteer hours determined by the time required to complete the procedure.[55] This program *does* make exceptions to the oral health education class for dental emergencies, in which case people would immediately be scheduled with a dentist.[55]

The clinical notes made by the hygienist during the prophylaxis appointment are then forwarded to the dentist who will be treating the patient.[53] The patient will visit the

assigned dentist for a treatment plan.[53] Once an initial exam and treatment plan has been performed by the dentist, a determination of volunteer hours required to complete the needed treatment is made by CHC.[55] If the patient lacks transportation, Community Healthcare Connections provides gasoline vouchers or bus tokens in order to help ensure the patient will attend their dental appointments and volunteer commitments.[55] The patient may then begin to volunteer for the number of hours needed for dental treatment.

The Calhoun County Dentists' Partnership appears to have had an effect on the number of people who seek dental treatment at the emergency room of the Bronson Battle Creek Hospital, which was down 70% from 2006.[53] When patients with dental pain present to the emergency room, they are referred to the program.[55] Since inception of this program, repeat visits to the emergency room by patients with dental-related problems is below 2%.[55]

In addition to the decline in hospital emergency room visits since 2007, over 3,300 participants have been provided over $750,000 in dental services.[55] A value of $1,433,650 has been placed by the program administrator on the volunteerism generated by program participants.[53] Due to the success of this program, at least 13 similar programs have been implemented in other communities throughout the Midwest.[55]

Muskegon Volunteer for Dental Care is one of these programs.[56] This program began as a pilot in 2010 and opened to the public in 2014.[57] The program details are very similar to the Calhoun County program. One of the differences is giving the option of volunteering 8 hours in order to have one urgent need addressed, as opposed to the

starting requirements of becoming a patient of record and going through the oral health education class and first having a prophylaxis.[56] Another difference between this program and the one in Calhoun County is that the initial four volunteer hours only cover the cost of the radiographs and exam which is completed at the dental office to which the patient is assigned.[57] Although four volunteer hours are equal to $100 in treatment, fees are based on average fees for area dental offices.[57]

There are 15 non-profit organizations at which the patients can complete their volunteer hours. This program currently has 13 volunteer general dentists, 5 specialists and approximately 100 patients.[57] In addition, the program also works with a group called “Mission for Area People” which has a medical/dental fund used for special circumstances such as patients needing scaling and root planing or a root canal.[57] The income limits for eligibility has recently been increased to 250% of the Federal Poverty Level.[57]

2.22 Care Free Dental Pay It Forward Program

The program of interest for this study is called the Care Free Pay It Forward Dental Program.[17] This program is a partnership between Care Free (a mid-Michigan area non-profit organization which provides medical, dental, optometry and behavioral health services), and the Central District Dental Society of Michigan.[16] The Care Free Pay It Forward program began as a pilot program in early 2014 and was made available to the public in the fall of that year.[17]

The Care Free Dental Clinic serves over 7,000 patients without insurance or without access to affordable health care.[16] The clinic accepts Medicaid and provides

cleanings, x-rays, fillings or extractions to the privately uninsured community residents at reduced fees.[16] However, the Pay It Forward Dental Program was created to serve a special group of patients.[17] To qualify for the Pay It Forward Program, a patient must be an adult without commercial dental insurance *or* Medicaid insurance, *and* the individual must earn below 250% of the Federal Poverty Level.[17] Although there are some similarities to the Calhoun County Program, the Care Free Pay It Forward Program is not designed to treat patients with dental emergencies.[17] However, it does require the patient to volunteer to earn their dental treatment.[17,54,56]

If the patient meets eligibility requirements, they fill out the necessary paperwork, complete four initial volunteer hours and then attend an oral health education class at Care Free.[17] After completion of the oral health education class the patient receives a dental prophylaxis and any necessary radiographs.[17] They are then assigned to a volunteer dentist.[17] The dentist completes an initial examination and a treatment plan for the patient.[17] The number of volunteer hours needed to complete the treatment plan is calculated based on the Medicaid fee schedule.[17] The patient then completes the designated number of volunteer hours at one of 80 agencies in the area that utilize volunteer workers, and returns to the dentist to obtain their care free of charge.[17] When the Care Free Pay It Forward Program began, it only accepted residents of Ingham County. However, it later changed to also include adults outside the county who are in need.[17]

There are several advantages to this type of program. First, the dental needs of a greater number of underserved individuals are being met. Second, with more patients receiving preventive care, there will likely be a decline in dental-related emergency

room hospital visits, which could potentially lower costs. Third, there is evidence to suggest that volunteering can raise aspirations and self-worth, as well as build skills and confidence levels.[52,55,58] Additionally, there is an increase in community involvement as a result of volunteerism.[17,53,55]

2.23 Gaps in Current Research About Free Dental Clinics Requiring Patient Volunteering

Collaborators at Care Free have requested an evaluation of both the dentist and patient perceptions of their Pay It Forward Program in order to gauge its success. A search of DOSS, CINAHL and PubMed was completed using the MeSH terms: (free health clinic) AND (("Health Knowledge, Attitudes, Perception"[MeSH] OR "Patient Acceptance of Health Care"[Mesh]) AND ("Dental Clinics"[MeSH] OR "Dental Health Services"[MeSH])). These searches did not lead to any published research on the topic of the attitudes, motivation or perceptions of the participants of such programs. The purpose of this research therefore is to study the attitudes, motivations and perceptions of both the dentist and patient participants, and to assess the impact of participating in such a program on patients' oral health-related quality of life. Ultimately, the findings should provide a basis for recommendations for improvements of this program and others like it.

While no formal assessment of the patient and dentist participants of the Calhoun County Dentists' Partnership nor the Muskegon Volunteer for Dental Care could be found, an informal assessment of the Calhoun County program was discovered in an article by Higbea et al.[53] The feedback from dentists was constructive and positive. A common theme among the dentist comments was "giving back to the community."[53]

Furthermore, the patients who completed feedback forms reported an increased feeling of self-worth.[53]

2.24 Public Health-Related Program Evaluation/Survey Research

Public health research achievements in the U.S. contributed to increasing life expectancy by 30 years throughout the 20th century.[59] Immunization programs to control infectious diseases, treatment and disposal of sewage, safe food and water, prevention of injury and prevention and cessation of tobacco use are among the achievements gained.[59] The use of Evidence-Based Public Health (EBPH) includes "making decisions on the basis of the best available scientific evidence, using data and information systems systematically, applying program planning frameworks, engaging the community in decision making, conducting sound evaluation, and disseminating what is learned."[59]

The benefits of using an EBPH approach include greater workforce productivity, implementation of successful programs and policy, access to more and better quality of information, and higher efficiency of the use of private and public resources.[59] It is important to generate scientific information on the most promising programs, policies and procedures for effective health promotion.[59] In addition, in order to transfer scientific evidence into practice, it must be incorporated from peer-reviewed literature to the real-world environment.[59] Once this has been accomplished, the proven effectiveness of these interventions must be disseminated on a wide scale at the state and local levels.[59]

Poor health outcomes are strongly related to poverty.[59] Therefore, after the generation of sufficient evidence, the specific focus of interventions that address the

elimination of health disparities should be implemented.[59] By evaluating the Care Free Dental Pay It Forward Program, oral health disparities of the uninsured and underserved in mid-Michigan and beyond may be improved upon.

For nearly the past half-century, public belief has been strong regarding the importance of scientific research for enhancing quality of life and economic prosperity.[60] "Research is a process for collecting, analyzing and interpreting information to answer questions."[61] The use of surveys in research is a common method of gathering information.[62]

Surveys are useful tools for revealing demographics, knowledge, behaviors, expectations, needs, opinions, lifestyles, attitudes and trends.[62] In addition to ease of use, Blessing and Forrester also indicate that surveys can be quick, inexpensive and consistent tools for research.[62] Surveys can be conducted through traditional mail, by telephone or in person. Some of the challenge in survey use is establishing causality – which is determining the effect on one variable by manipulating another variable.

Other limitations can be responder bias, non-response bias, respondent interpretation, and reliability of self-reporting of respondents. Therefore, the survey instrument must be understandable, clear, short, exact and answerable. Often times it is necessary to utilize a variety of question formatting, such as open-ended questions, list responses or multiple choice, ranking or comparison scale questions or Likert-like scale questions. It is important to pilot test the survey, once developed in order to ensure understandability. If well-developed, surveys can be useful at providing a wealth of information.[62]

In a meta-analysis by Shih et al., 35 studies comparing the response rates over the previous ten years of mailed surveys versus email surveys were examined.[63] Traditionally mailed surveys yielded on average nearly 20% higher response rates than e-mail surveys.[63] Furthermore, variables like the use of incentives, random assignment of respondents into mail and e-mail groups, or article type did not provide statistically significant changes in response rates between the two groups.[63]

In another study by Bakan et al., 976 prostate cancer survivors were examined to determine whether a $5 gift certificate or use of Priority Mail delivery, or both increased the response rate of mailed surveys before and after a reminder letter and second mailed survey.[64] Before the reminder and second survey, response rates were significantly higher for the Priority Mail groups over the Priority and gift certificate and control groups. After the reminder and 2nd survey mailing, the differences between the groups were no longer significant.[64]

A study by Hardigan et al. examined 6000 dentist responses to electronic vs. mailed surveys.[65] Although it seemed that electronic survey methods would cost less than traditional mail, the advantage is negligible when you compare cost effectiveness with response rate.[65] Given the choice between mailed or electronic surveys, dentists are over 15 times more likely to respond to a paper survey.[65]

Another study by King et al. examined the translational and conceptual equivalence of survey questionnaires for a multi-language, multi-ethnic study.[66] In surveying individuals who speak a language other than English, it is necessary to utilize traditional forward-backward translation to ensure that the backward translation is the same as the original.[66] In addition, it is important to utilize translators who are proficient

in both English and the other languages under study, so that participants' feedback is consistent with what is being asked.[66]

2.25 Summary/Conclusions

Because oral health is fundamental to maintaining overall health, all people should be granted access to receiving oral health care.[1] However, a lack of access to oral health care services still exists among certain population groups related to age, race, ethnicity, physical & mental state, geographic location, income and insurance status. This lack of access creates problems for the individuals and for society as a whole. As programs like the Care Free Pay It Forward Dental Program attempt to address this lack of access, it is imperative that such programs obtain assessment and feedback in order to determine their success. The purpose of this study is to provide necessary feedback.

CHAPTER III

MATERIALS AND METHODS

3.1 Overview of Study Population

Due to both the high number of residents of Ingham County, Michigan who fall below the Federal Poverty Level, and the large number without dental insurance, a partnership between the Central District Dental Society of Michigan and Care Free Dental has been established. This program began in the fall of 2014 as a means for providing access to dental care for underserved in the community. Collaborators from Care Free Dental agreed that the results from this research study will be beneficial to their program.

The source population for the study consists of adults living in Ingham County, Michigan and surrounding areas. Study participants were in need of dental care and earned below 250% of the Federal Poverty Level. In addition, they needed to be willing and able to volunteer in their community in exchange for dental treatment.

All past and current patients who have enrolled in the Pay It Forward Dental Program were recruited by way of U.S. mail. The study consisted of 38 participants. It is important to note that each participant was not in the same phase of treatment at the time of the study. In addition to the 27 patients who responded to the survey, demographic information was provided by Care Free for 11 program participants who

did not respond to the survey, and for another 28 individuals who were initially interested in the program, but never followed through with volunteering or treatment. The demographic information for those who did not participate in the program was gathered in order to help fulfil Specific Aim #3 of the study.

In addition, all dentist participants who volunteered for the Pay It Forward Program (n = 11) were members of the Central District Dental Society of Michigan. They were recruited in the same manner as the patients.

3.2 Study Design

This research is a program evaluation study. It consisted of research with two different populations, namely (a) the patients in the Pay It Forward Program, and (b) the dentists who provided care for these patients. Both groups of participants responded to surveys. The design was a population study with a cross sectional design.

3.3 Materials

Two separate surveys were used as the instruments of measurement. Cover letters and surveys were developed in both English and Spanish to address Specific Aims #1 and #2: To assess the motivation, attitudes and evaluations of the patients who participate in the Pay It Forward Dental Program as well as their experiences with this program; and to assess how the patients' dental health affects their oral health-related quality of life (see Appendices A, B, C, D). Because a significant number of Pay It Forward participants were Hispanic, a Spanish version of the patient cover letter and survey was developed through the process of forward translation by two English-speaking University of Michigan dental students who were familiar with the survey

terminology and whose mother tongue was Spanish. The survey was first translated into Spanish by one dental student and then back-translated into English by the second dental student. This process was used to eliminate discrepancies and assure consistency of the English and Spanish language survey versions.

The patient survey was divided into six sections. The first section was devoted to background/demographic information. The second section inquired about the patients' dental health. Section three asked the patients about their reasons for enrolling in the Pay It Forward Program, which type of volunteering they had done, and which dental treatment they had received to date. The next series of questions were related to oral health-related quality of life. The last series of questions asked about the patients' feelings toward their experience with Pay It Forward and their volunteering experience. Finally, there were three open-ended questions asking about patient likes, dislikes and suggestions for program improvement.

A second cover letter and survey was developed to address Specific Aim #4: To evaluate the motivation, attitudes and evaluations of the dentists who volunteer in the Pay It Forward Dental Program, and their experiences with this program (see Appendices E, F). The dentist survey consisted of four sections of questions. The first section focused on demographics. The second section related to involvement with the Pay It Forward Program. The third section inquired about experiences with volunteering. Finally, there were three open-ended questions asking for feedback about the program and suggestions for improvement.

The recruitment cover letter included in the patient mailing packet (both English and Spanish versions) described the study intent, assured the respondents that their

answers were confidential, and informed them about the U-M Institutional Review Board (IRB) approval and the incentive for participation. The patient incentive consisted of a certificate for two volunteer hours, equal to $50 toward participant dental treatment. Each dentist packet contained a recruitment cover letter which explained study intent, assured confidentiality and notified them of IRB approval.

Prior to dissemination, both surveys and recruitment cover letters were pilot tested with several U-M faculty members with a background in public health, staff members from Care Free and an independent dentist. The pilot testing was conducted in order to assure that all wording was understandable, that the questions would measure what they were intended to measure, and to estimate the time it would take to complete the surveys.

In addition to pilot testing, readability assessments were conducted to determine the level of reading difficulty and/or an approximate reading grade level using several different indices (http://www.readabilityformulas.com/). The results of these assessments showed that according to the Flesch Reading Ease score, the reading level was standard/ average. According to Gunnig Fog, it was fairly easy to read, according to Flesch-Kincaid Grade Level it was a seventh grade reading level, according to Colemen-Liau Index, it was a seventh grade reading level and according to the SMOG Index it was a seventh grade reading level, with an Automated Readability Index of fourth and fifth grade.[67]

3.4 Survey Dissemination

Phone calls were made by Care Free Dental staff to dentist and patient participants during the week of February 23rd 2015, prior to the initial mailing of the surveys in order to alert the program participants that a survey would be sent by postal mail. Thirty-four patient and 11 dentist survey packets were mailed on Saturday, March 1st, 2015.

Reminder phone calls were made by Care Free staff to dentist and patient participants to those program participants who had not already returned the survey by the start of the week of March 23rd, 2015. A second round of reminder calls to those remaining participants who had not returned surveys was made by Care Free staff during the week of April 13, 2015.

A second mailing of 12 patient survey packets was sent by Priority Mail in the week of June 15th 2015, to non-responding and new participants, in an attempt to get a higher percentage response. There was a revised date for response on the recruitment cover letter of July 15, 2015. This second mailing prompted the return of five additional patient surveys.

3.5 Data Analysis

SPSS Version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) was utilized for the data analysis. Descriptive statistics such as frequency distributions, means and standard deviations were computed to provide an overview of the data. In addition, tests for the significance of Pearson correlation coefficients and chi square tests were used to explore whether

relationships between variables were significant. Independent samples t tests were used to compare the average responses of subgroups such as male vs. female patient respondents.

3.6 Human Subjects

This study did involve survey procedures with human subjects. University of Michigan Institutional Review Board approval was sought and obtained from the Institutional Review Board for the Behavioral and Health Sciences. Exempt status was granted on November 25, 2014 (see Appendix G).

3.7 Consultants/Collaborators

Two staff members from the Care Free Dentals' Pay It Forward Program, Audrey Taylor, RDH, BSDH, the Director of Ancillary Services, and Christina Arriaga, the Dental Clinic Coordinator of Care Free Medical & Dental in Lansing, MI collaborated with the student investigator on this research project (see Appendix H).

CHAPTER IV

RESULTS

4.1 Background Characteristics of all interested in the Pay It Forward Program

Table 1a provides an overview of the background characteristics of the patients who participated in the program (N=38), versus the patients who initially showed interest and filled out a demographics form, but then did not follow through and did not participate in the program (N=28). The combined total of both (N=66) is provided in the "originally interested" column. A comparison of the background characteristics of these two groups showed that the two groups did not differ in their gender distribution, and their average age. Both groups were more likely to have female respondents who were on average in their mid-forties. However, there was a statistically significant difference (p=.035) in the ethnic/racial background of the two groups with participants more likely to be white (88%) than non-participants (50%). When the patients were asked if they were Hispanic or not, 47% of the participants and 41% of the non-participants identified as Hispanic. Seventy-four percent of the participants and 79% of the non-participants spoke English as their first language. Most of the non-participants were single (58%), while an equal number of participants were married (41%) versus single (41%). While the two groups did not differ in their average household income, the participants were

more likely to have on average more household members than non-participants (4.44 vs. 2.84; p=.019).

When asked about how the participants and non-participants had heard about the program, the two groups differed significantly (p=.010). Forty percent of the non-participants responded that they had obtained information from family members, 30% from the news, and 25% from the Care Free website. However, the participants had mostly heard from friends (29%) and the news (21%), with only 13% having received information from their family members and 8% from the Care Free website. Information about whether the respondents lived in a location with a bus route being available to their assigned dentist could only be determined for program participants, with 81% of the participants living in a location with a bus route available. The two groups did not differ in the average miles to the Care Free clinic from their homes nor in whether they had an available bus route to the Care Free Clinic. Sixty-two percent of the non-participants lived in a location with bus route availability to Care Free. Program participants lived an average distance of 11.25 miles from Care Free, while the non-participants lived an average distance of 9.37 miles away. Mileage to Care Free for both groups ranged from 1.3 miles to 62.6 miles (SD±12.2).

Table 1b provides an overview of the background characteristics of those of the 38 participants in the program who responded to the survey (N=27) versus those who did not participate in the survey (N=11). While the participants in both groups tended to be female (63% vs. 82%; n.s.) and were on average in their forties (48.7 vs. 39.6; n.s.), the race/ethnicity of the two groups differed with 100% of the respondents who answered the question about race being white compared to 57% of the non-

respondents. While the majority of the non-respondents spoke English as their first language (91%), 33% of the survey respondents reported that their primary language was Spanish (p=.040) .The marital status of the two groups (survey respondents vs. non-respondents) did not differ significantly, nor did the household income. However, there was a statistically significant difference (p=.039) in the average household size between the respondents (mean=2.35) and the non-respondents (mean=1.38). The two groups also differed in how they had heard about the program (p=.010). The source of information for participants was through friends (29%) and others (29%), whereas most non-participants had heard about the program through family (40%) and the news (30%).

4.2 Program Participants

Tables 2 to 12 provide an overview of the responses of the 27 survey respondents. Table 2 shows that 63% were female and 37% were male and that their average age ranged from 22 to 75 years with an average age of 48.7 years (SD±17.1) (see Table 2). The years of schooling ranged from 3 to 21 years with an average of 13.7 years (SD±3.5). Twenty-six percent of the respondents worked full-time, 22% were retired, 19% were unemployed, and 19% were homemakers. In addition, 7% were on disability and 4% worked part-time.

Table 3 provides an overview of the oral health-related responses. When survey respondents were asked how healthy their teeth and gums were before they entered the Pay It Forward Program, 33% responded that their oral health was poor, 33% that it was fair, 30% it was good and 4% responded that it was very good (on a scale of 1=poor to 5=excellent, patients described the health of their teeth and gums before becoming

involved with the PIF program on average 2.04). When asked how the health of their teeth and gums were at the time of the survey with 1=poor to 5=excellent, the average answer was 3.22, a large improvement from the average response before they joined the PIF program. Figure 5 shows that there was a significant difference in their average oral health before the program start and the current time at which they responded to the survey ($p<.001$).

When asked about the importance of their oral health before the program vs. at the time of the survey, 52% indicated that it was very important before and 89% that it was very important after being in the program. Figure 6 shows that the average importance ratings differed significantly ($p=.001$), with the current mean reflecting a higher importance.

While no person had full dentures, 15% had partial dentures. The frequency of brushing ranged from nearly every day to more than once a day, and the frequency of flossing ranged from rarely to more than once a day. When asked when they had their last dental visit, 33% responded that it was more than five years ago, 22% that it was between three and five years, 26% that it was one to two years ago and only 19% had had a dental visit within the year before beginning the Pay It Forward Program. In addition, the respondents indicated whether they had different kinds of dental treatment. While the majority had had a cleaning before (63%), only 44% reported to have had x-rays, 30% had a filling and 26% had an extraction. No one reported that they had a partial or full denture in response to this question.

Table 4 provides an overview of the responses concerning participation in the Pay It Forward Program. When asked at which point they were in the program, 30% had

completed their initial dentist appointment, 22% were finished with their treatment, 19% responded that they were just completing their initial four volunteer hours, 19% reported that their dental treatment was partly finished and 7% were completing the second round of volunteer hours. When asked which dental treatment they thought they needed when they heard about the program, the largest percentage thought that they would need a cleaning (89%), followed by fillings (67%), x-rays (59%), and extractions (37%). The "other" category (11%) included those thinking they needed a root canal, deep cleaning or bite splint. When asked whether they had pain in their mouth before entering the program, 70% of the respondents responded with "yes". On a scale from 1=no pain to 5=terrible pain, they described their pain on average as 2.81.

Respondents also reported where they had completed their volunteer hours. Thirty-one percent had done church related volunteering, 18% school-related volunteering, 18% worked with non-profit agencies, 9% in building improvement and construction, and 6% reported healthcare related volunteering. Five additional agencies were listed with one respondent for each agency. When asked how many hours they had volunteered, the responses ranged from 5 to 100 hours, with an average of 33 hours provided (SD±26.32). Sixty-nine percent had volunteered before joining the program. When asked which types of services/treatment they had received as part of the Pay It Forward Program, 78% had participated in the oral health class, 82% had a cleaning, and 85% had x-rays. Over a third of the participants had fillings (37%) and extractions (37%), and 7% listed other treatments.

The survey also included the Michigan Oral Health-related Quality of Life Scale – Adult version.[68] The 14 Likert style items of this scale state negative states of OHRQoL

and the answer scale ranges from 1=strongly disagree to 5=strongly agree. Table 5 shows that the average answers to the 14 items ranged from 1.92 to 2.92. Thirty-eight percent agreed/strongly agreed that their teeth and gums caused them discomfort and affected all aspects of their life. Thirty-six percent agreed/strongly agreed that their teeth and gums caused a lot of worry and concern and 35% that it reduced their general happiness with life. Thirty-four percent agreed/strongly agreed that their teeth and gums limit the kinds and amount of food they eat. All of the agree/strongly agree responses for the remaining oral health-related quality of life questions were under 30%.

Table 6 shows that male vs. female respondents did not differ in their oral health-related responses. There was only one statistically significant difference in response to the oral health-related quality of life statement, *My teeth and gums limit the kinds or amounts of food I eat.* Female respondents agreed more strongly with this statement than male respondents.

Table 7 provides an overview of the correlations between the length of program participation and the oral health-related quality of life responses and other oral health-related responses. The more importance they had placed on their oral health before the program, the more advanced the respondents were in the program (r=.49; p=.011). In addition, the further along the patients were in the program, the more frequently they brushed their teeth (r=.39; p=.050), and the more frequently they flossed their teeth (r=.43; p=.030). The average oral health-related quality of life is significantly correlated with their subjective oral health before they began the program (R=.60; P=.002). The poorer the respondents saw the health of their teeth and gums before they started the program, the poorer was their oral health-related quality of life, and the less important

they thought their dental health was before beginning the program (r=.56; p=.002). In addition, the more important their dental health was before they started the program, and right now, the more frequently the patients brushed their teeth (r=.56; p=.003/r=.45; p=.019 respectively).

One interesting question is whether the stage in the program participation is correlated with how much the patients like the program. Pearson correlation coefficients were used in order to determine statistical significance. Table 8 shows that there was no significant relationship between which stage of program participation the patients were in and whether they liked the program. Whether they had just enrolled, had just begun to volunteer, had already received treatment or had concluded their treatment, had no bearing on how much they liked the program.

One final set of questions asked the participants to evaluate the Pay It Forward Program (Table 8). These statements were also Likert style items with a 5 point response scale ranging from 1=strongly disagree, to 5=strongly agree. On average, participants agreed/strongly agreed that they like to volunteer for their dental care (77%) and that it is not difficult to volunteer (74%), but they disagreed/strongly disagreed that volunteering keeps them from working and getting paid (68%), and that it takes time away from their families (85%). On average, the respondents were neutral in regard to the question whether oral health education classes were interesting or helpful (mean=3.36 and 3.52 respectively). They agreed/strongly agreed to the statements that the dentist and the staff treated them well (77%), provided good care (77%) and treated them with respect (77%). They strongly disagreed/disagreed with the statement that they had to wait too long for their dental treatment in the program (67%). On average,

they agreed/strongly agreed that they wanted to stay in the program (63%), they agreed/strongly agreed that the Pay It Forward Program helped them a lot (81%), that they liked the program (82%), and that they would recommend it to family members and friends (78%).

Table 9 shows correlations between the total charges the patient would normally incur for the treatment that they received, and their program evaluations. It is interesting to note that there was no significant correlation between the dollar amount associated with treatment received, and how much they liked the program.

Three open-ended questions were included in the survey. The first one asked what the survey respondents liked about the Pay It Forward Program (Table 10). Twenty-six percent said the dental care and the education, and another 26% said everything. In addition, 18% stated that they liked volunteering, 13% said that they liked not needing dental insurance in order to receive treatment, and 11% liked the professional staff.

Table 11 provides an overview of the open-ended responses concerning what the participants did not like about the Pay It Forward Program. The majority said that there was nothing that they disliked (57%). Communication with the staff and the fact that limited treatment was offered was mentioned by a few people (17% and 13% respectively). Waiting for treatment and that the process was complicated were also mentioned as responses (9% and 3% respectively).

The final question asked what the respondents would like to change about the program to make it better. These responses in Table 12 showed that many participants

(40%) felt that everything was good. Twelve percent thought that the program should be promoted more to increase participation, 12% wanted to have more comprehensive treatment offered and 8% would like to see the website updated with a fax number along with the ability to download forms. Another 8% simply replied “thank you.” One response each was concerned with informing patients of all volunteer hours needed prior to the initial cleaning, and that they would like to have better communication such as a call back the next business day by program staff.

4.3 Background Characteristics of Dentists

Tables 13 to 18 provide information about the survey responses of the participating dentists. Table 13 shows that of the ten participating dentists, nine reported their background characteristics. Of those, eight were male, one was female, and they ranged in age from 32 to 67 years with a mean age of 57.11 years (±10.47). Most providers were Caucasian (N=8), and had practiced dentistry between 6 and 43 years (mean = 29.50, ±10.16). Two providers had specialty training, with one indicating Oral Maxillofacial Surgery, and the other an Orthodontist. Seven practiced in a solo practice, two in a partnership and one in an associateship. Five dentists accepted patients covered by Medicaid, and all accepted dental insurance and private pay. However, of the dentists that did accept Medicaid, not more than 5% of their patients were Medicaid recipients. One dentist worked only 2 days per week, two worked 3 days, four worked 4 days, two worked 4.5 days and one worked 5 days per week. The number of patients treated in an average week therefore, ranged widely from 24 to 160 patients (mean=78, ±50.86).

Table 14 provides an overview of the dentists' responses related to participation in the Pay It Forward Program. When asked how long they had participated in the program, the number of months of participation ranged from 3 to 24 months, with an average participation length of 12 months (±8.83). When asked if they had ever volunteered their dental services before they joined the PIF program, nine of the dentists reported that they had done so. Six had donated their volunteer activities at the Care Free Clinic, four stated Donated Dental Services, two provided pro-bono cases, and six other locations with one response each were named including the Ingham County Health Department, LCC Kids, the Michigan Dental Association, the Medical Access Program, Missions of Mercy and a church program. When asked how many pro-bono cases they took on in 2014 other than from PIF, the numbers ranged widely from 0 to 30. When asked how many patients they have treated so far in the PIF program, one had treated only 1 person, three had treated 2, two had treated 3, two had treated 4, and one each had treated 8 and 10 patients. In response to the question how they had heard about the PIF program, five had heard from the Care Free Clinic, two through their dental society, one through another dental professional, and one stated that they were a founder of the program. The responses regarding why they decided to volunteer in the PIF program were either that they believed that it was a good idea/model (N=5), that they believed that there was much need in Ingham County and they wanted to help people access dental care (N=2), and it allowed them to give back, yet work from their own office (N=2). In response to the question how the average oral health of the last PIF patient was for whom they had provided an initial exam, two of the dentists reported it was poor, one it was fair and five it was good. For the dental treatments they provided

through the PIF program, the answers included x-rays (N=10), prophylaxis (N=8), fillings (N=8), extractions (N=6), maxillary and mandibular partial dentures (N=2), and root canals (N=2); 1 had provided a bridge.

Table 15 provides an overview of the dentist responses concerning program evaluation questions. The providers liked the PIF program (seven agreed/strongly agreed that they liked the program). However, two disagreed that they liked the program. In response to the statement that the PIF program is an innovative way of addressing the access to care problem, seven agreed/strongly agreed and two strongly disagreed. In response to the statement that volunteering for the PIF program is rewarding, seven agreed/strongly agreed, while two disagreed/strongly disagreed. Seven of the dentists agreed/strongly agreed with the statement that they liked to give back to their community, while two strongly disagreed. Six of the dentists agreed/strongly agreed that patients in the program appreciate their help, while three disagreed/strongly disagreed with this statement. In response to the statement that the patients were on time, five agreed/strongly agreed, two disagreed/strongly disagreed, and two were neutral. In response to the statement whether they would recommend involvement in the PIF program to their colleagues, six agreed/strongly agreed, two disagreed/strongly disagreed, and one was neutral. When asked whether their staff members found value in the PIF program, seven of dentists agreed/strongly agreed, and two disagreed. When asked whether their staff members liked the PIF program, seven of dentists agreed/strongly agreed, one disagreed, and one was neutral. When asked whether they would continue to volunteer in the PIF program, seven of dentists agreed/strongly agreed, and two disagreed. In response to the statement that they

would recommend participation in the program to other dentists, seven agreed/strongly agreed and two disagreed. Two of the dentists were consistently negative in their responses to the program evaluation statements, therefore seemed dissatisfied with the program.

Table 16 shows an overview of dentist responses to the open-ended question regarding what they liked about the program. The majority (8) liked that the patients volunteer/donate time to earn or invest in their own care. Three of the providers liked that they helped the community, two that they can work from their own office, and one each liked that they do not need to make a prolonged commitment to the patient, that the patients are on time, and that the patients receive pre-enrollment education.

In response to the open-ended question regarding concerns the dentists have about the PIF program, Table 17 shows that two were concerned that the volunteer hours should be tied to a specific agency or within the dentists' community. One was concerned because the provider was not assigned many patients, one respondent was concerned about when the relationship with the patient ends, one thought that the treatment provided was not comprehensive enough and one had some a concern with the method of patient selection.

The final open-ended question (Table 18) asked the respondents to provide any suggestions they may have for improving the program in the future. Two dentists stated that the program was great. One stated that the PIF program should find a lab to participate so that more extensive treatment could be offered. One would like CE credits for participating in the program. In addition, one respondent wanted a solution to clarify when the relationship with the patient ends; one suggested that if area hospitals are

relieved of financial burden, then they should help contribute to the program. Finally, one suggested that the patients should provide community service in the participating dentists' community.

4.4 Overview of the Dental Services Provided and the Costs for these Services

Table 19 provides an overview of the dollar amount associated with the services provided to each patient, as well as the grand total for dental services provided as part of the Pay It Forward Program from the time of program inception in 2014 until final data collection in mid-July 2015. Descriptive statistics were used to determine the average dollar amount of services provided to each patient ($1,153, SD±$1,067.5).

Frequency distributions were used in Table 20 to provide an overview of the different types of treatments that were provided as part of the Pay It Forward Program, and the number of times preventive or diagnostic procedures were provided. Treatment included preventive services, amalgam and composite restorations, extractions, root canal therapy, crown and bridge and partial dentures.

CHAPTER V
DISCUSSION

The goal of this study was to gain an understanding of how the participating patients and dentists perceive Care Free Dental's Pay It Forward Program. Patients' attitudes towards their volunteering experience, along with their satisfaction with their dental treatment and of the program overall were assessed as contributing factors to the success of the program. Likewise, the dentists' attitudes towards their volunteering experience and their perceptions of the strengths/weaknesses of the program helped to determine its' overall success. Additional aims were to assess how the participating patients' improved oral health affects their oral health-related quality of life and how the sociodemographic characteristics of patients who registered for the Pay It Forward Program but did not follow through differed from those of patients who received care through the PIF Program.

Access to oral health care for many groups and individuals is still a problem in the U.S. today.[1,5,18] Finding alternative ways to address this problem by increasing access to care is important. The program under study has attempted to do just that. Evaluation of this program is necessary for continued improvement, thus continued access.

With regard to Specific Aim 1: To assess the participating patients' motivation, attitudes and perceptions of the Pay It Forward Dental Program as well as their

experiences with this program, it was hypothesized that the patient participants would find their volunteering experiences to be positive and worthwhile, and perceive their dental treatment as valuable and important. The data showed that the patients' perceived oral health had increased significantly from before they began the program compared to the time they responded to the survey. In addition, the perceived importance that patients placed on their own oral health had also on average significantly increased from before beginning the program.

Concerning why these patients sought care, the data showed that 70% of patients were experiencing pain at the start of the program, with pain and discomfort being primary concerns that affect a persons' quality of life.[45] Therefore, it would appear that pain was a motivating factor for seeking treatment through the PIF Program. In addition, 89% of participants thought they needed a cleaning and 59% needed x-rays at the start of the program, so prevention and diagnosis of other needs could have also impacted seeking treatment.

With regard to patients' volunteering experiences, patients volunteered an average of 33 hours (SD±26.32) in order to receive their dental treatment. However, since patients were at varying stages of program participation at the time of survey completion, they may not have completed their volunteering or dental treatment. Overall the majority of participating patients liked to volunteer in exchange for dental treatment, and did not think that volunteering was difficult. In addition, they did not find that volunteering kept them from working and getting paid, and it did not take time away from their families. However, it is not known whether volunteering might have prevented potential patients from participating in the program.

Nonetheless, a program of this type can lead to the question of whether the concept of volunteering in exchange for dental care is a form of exploitation of the working poor in this country.[69] The working poor are defined as those who spent at least 27 weeks of the year in the labor force, but whose incomes still fall below the Federal Poverty Level.[70] There is a debate about whether health care is a market commodity that should be based on profit, or a basic human right to which everyone is entitled.[69] There are millions of Americans who earn incomes just above the Federal Poverty Level, disqualifying them from receiving Medicaid or subsidies towards healthcare. Yet, their employers avoid the obligation to provide health care coverage by classifying them as independent contractors or part-time workers.[71] Even for those under 138% of the poverty level who now qualify for benefits under Medicaid Expansion, the subsidized premiums are difficult to afford when combined with co-pays and low wages.[71]Additionally, background responses of dentists in Table 13 confirmed the findings from other studies in which dentists are less willing to accept Medicaid insurance.[26,28,31,32] Of the 50% of dentists in this study that did accept Medicaid, those covered by Medicaid insurance only comprised an average of 1% of their patient populations. This finding implies that there should be some sort of incentive for dentists to treat Medicaid patients in their practices.

Although program participants did not object to volunteering in exchange for dental care in this study, other low income working adults may need to work two or more jobs in order to make ends meet, leaving little time to volunteer. Moreover, for those with children, volunteering may cost more than time, as they may be forced to pay for child care during the time that they would be able to volunteer.[72] For many, this

complication defeats the purpose of this particular program. Perhaps if child care were offered when participants volunteer, there may be more patient interest in this program.

Although many patients responded that they would recommend the program to others (78%), patients also strongly disagreed/disagreed (67%) that they had to wait too long to receive treatment. Data from this study confirmed that overall patients did like the program. However, some patients did offer recommendations for improvement including promoting the program more and offering more comprehensive treatment.

While Care Free states that treatment offered through PIF is limited to oral health education, exams, cleanings, radiographs, fillings and simple extractions, some participating PIF providers chose on their own to do more. Following is a comprehensive list of treatment provided through the PIF Program by administrators at Care Free between the dates of program inception in January 2014 through July 2015. In addition to the preventive, restorative and extractions covered through the PIF Program, services delivered included 6 core build-ups, 32 quadrants of scaling and root planing, 4 endodontic treatments, 1 teeth whitening treatment, 1 bonded denture, 1 instance of nitrous oxide delivery, 1 Peridex treatment, 2 crowns, 1 four-unit bridge, 1 maxillary partial, 1 mandibular partial, 1 instance of IV sedation, 1 treatment for dry socket and 1 occlusal guard. The combined value of all Pay It Forward treatment provided between January 2014 and July 2015 totaled over $43,800.

With regard to Specific Aim 2: To assess how participating patients' improved dental health affects their oral health-related quality of life, it was hypothesized that the PIF patients' improved dental health will positively affect their oral health-related quality

of life. Table 5 showed that the majority of participants strongly disagreed with each of the OHRQoL statements, with the mean for each response being below 2.93.

However, the stage of treatment was found to be important for how oral health-related quality of life improves. In addition, the more advanced patients were in the program, the higher the importance they had placed on oral health before the program, the more they brushed their teeth, and the more they flossed their teeth. These findings align with other studies which state that access to care has a direct effect on perceptions oral health and related quality of life, and the OHRQoL measurements can be used to demonstrate the need to improve oral health care access to underserved populations.[11,12,47] Nevertheless, the possibility exists that the correlation between the stage of program participation and frequency of brushing and flossing could also have been due to the fact that those patients placed more value on oral health, and may have already had better oral health habits before beginning the program.

Interestingly, in comparing oral health-related quality of life responses for men and women, there was one statement with a statistically significant difference. Females had stronger agreement than males with the statement *my teeth and gums limit the kinds or amounts of food I eat* (p=.032).

Specific Aim 3 focused on a comparison of the socio-demographic characteristics of patients who registered but did not follow through with participation in the program with the characteristics of patients who received care through the PIF Program. The hypothesis was that older patients (over 60 years of age), patients with higher household incomes, and those that live a greater distance from Care Free Dental Clinic will be less likely to follow through with the program.

There was no statistically significant difference in the average age of program participants and non-participants. This finding does therefore, not support this hypothesis. However, when filling out the demographics portion of the survey, several program participants listed “retired” under occupation. It stands to reason that people who are retired would have more time to volunteer than those who are working.[73]

Furthermore, those who showed interest but did not participate had no statistically significant difference in their average household income compared to those who sought treatment. This finding also did not corroborate with what was hypothesized and may be related to the non-participants average household size being smaller with about the same average income as the participants. Another possible reason for this surprising result could have something to do with the rise of the underground economy.[74] Over the last 30 years there has been a steady drop in union jobs, which has negatively affected employer sponsored health care, pensions, working conditions and wages. Illegal labor practices, in addition to negatively affecting business owners who play by the rules, exploit laborers who earn lower wages, causing them to work longer hours in order to get by.[74] These longer work days eliminate time for other things like health maintenance and volunteering. For those families with children, it keeps them from spending quality family time.[72] The Pay It Forward Dental Program was designed to fill a small niche by serving those between 133% and 250% of the FPL.

In comparing distance, results were not significant. For those who followed through with program participation, there were no significant differences from those who did not, in average distance from Care Free. In addition, the majority of patients in both groups had a bus route available to Care Free. This availability of a bus service made

participation in the program more feasible, which aligns with the study by Smith et al.[38.] Another consideration is that if transportation to and from Care Free and dental appointments is a problem for the patients, then it would also likely pose a problem for patients getting to and from their volunteer commitments. Information about whether the respondents lived in a location with a bus route being available to their assigned dentist could only be determined for program participants.

With regard to Specific Aim 4 that evaluated the participating dentists' motivation, attitudes and perceptions of the strengths and weaknesses of the PIF Dental Program and their experiences with this program, the hypothesis was that volunteer dentists would find their interaction with patients to be rewarding, and the care provided to be valuable. The results demonstrated that in response to statements related to program evaluation, dentists overall agreed/strongly agreed that the program was innovative, rewarding, and that they found value in the program. These findings align with previous literature by Wallis, regarding dentists' attitudes towards providing pro bono care.[75] In addition, open-ended responses describing what dentists liked about the program found they valued that the patient volunteers or is invested in their own care, that it helps the community and that they can work from their own offices. These findings align with what was hypothesized regarding program strengths. However, it appeared that the same two dentists were consistently more negative in their program evaluation responses. It would be interesting to survey these dentists further in order to find out why they had a different perspective on the program. Another possibility for the negative responses is that the dentists mis-read, or inadvertently reversed the strongly disagree responses with the strongly agree responses.

When asked about any concerns with the PIF Program, responses indicated that volunteer hours should be tied to a specific agency or within the dentist's community, that dentists were concerned that they were not assigned many patients, they were unsure when the relationship with the patient ends, that the program was not comprehensive enough, and they had concerns with patient selection. When asked about program improvement, responses recommended to find a lab to participate so that more extensive treatment can be offered, offer CE credits to participating dentists, clarify when relationship with patient ends, and have patients provide community service in the providing dentists' community. Further supporting the hypothesis that dentists would find their participation to be rewarding and valuable was the fact that 20% of respondents did not list any concerns, and that 20% specifically wrote "*no concerns".* In addition, 40% did not list any suggestions for program improvement, and 20% simply stated "*great program!"*

Outlook

It is important to note that Care Free Medical and Dental has decided to indefinitely suspend the Pay It Forward Dental Program in October of 2015. This was due to limited resources and Care Free staff available to effectively sustain and facilitate all aspects of the program.[76] Further, as a result of expansion of the Healthy Michigan Plan in April 2014, which provides dental coverage to an additional sector of the population who are at or below 133% of the FPL but do not qualify for Medicaid, fewer adults were showing interest in the program, impacting enrollment.[77] Since both the dentists and patients have found this program to be so positive, Care Free would be well positioned to look for other partners to help facilitate this program. Pay It Forward

might align well with Volunteers of America, whose focus is to help the most vulnerable and under-served people achieve their full potential.[78] In addition, it is recommended that Care Free consult with the Central District Dental Society of Michigan in order to brainstorm opportunities for continuation of the Pay It Forward program.

Contact had been established with representatives from both Calhoun County Dentists' Partnership and Muskegon Volunteer for Dental Care in June 2016 in order to determine where each program stands with regard to patient enrollment and program sustainability. As of June 1st 2015, the Calhoun County Dentists' Partnership had 150 patients and 30 dentists participating in their program. A representative from the program stated that the Affordable Care Act has had a huge impact on their program, and that their numbers continue to decline.[79] While they are uncertain what the future holds, they are still a resource to those who need dental care in their community.[79] A representative from Muskegon Volunteer for Dental Care stated that implementation of the Healthy Michigan Plan has absolutely affected their program.[80] There are currently 19 participating dentists, down from 23 previously, and from January 2014 through December 2015, 177 people received dental care.[80]

In summary, the results from this study will add to the body of knowledge on this subject, in that no other previous studies could be found relating to a dental program that provides dental care in exchange for patient volunteerism. Further, this information may influence health care leaders in other states, cities or communities to develop similar programs which would result in greater access to and utilization of oral health care services for underserved individuals. Additionally, even though this program was not specifically designed to reduce the number of non-traumatic dental emergency room

visits, it may inadvertently reduce ER costs due to an increased number of underserved people having their preventive and restorative needs met prior to their needs becoming emergent. Further research is needed to determine this impact.

A limitation of this study is the small number of both PIF patients (N=38) and dentists (N=10) participants. Some patients could not be recruited for study participation due to homelessness, lack of telephone service or frequent address changes. Further, cultural-language barriers and low health literacy may have affected participation in this study and therefore the results of this study. In addition, not all participants were in the same phase of treatment at the time of survey completion, which may also be a study limitation. One final limitation was that the respondents were not asked to evaluate their oral health-related quality of life before the program which resulted in not being able to compare if an increase in their oral health-related quality of life had occurred.

Future study recommendations include focusing on a program of this nature that has a greater number of patient and dentist participants, comparing several similar programs in order to determine which aspects of each program work best, or a longitudinal study of a program of this type. In addition, locating area hospital ER statistics both pre and post data collection to determine whether non-traumatic dental related visits were influenced by the program under study would be recommended. Further, if program evaluation responses by patients or dentists were negative, it would be advantageous in future studies to find out why.

Disclaimer on Employed Statistics

It is important to note that this survey could be considered a census and not a simple random sample of a larger population, as the study involved recruitment and surveying all program participants. Thus, some of the statistical comparison tests such as chi square and Pearson Correlation tests might be considered inappropriate since these tests involve assumptions of simple random sampling of study participants from a larger population, accounting for potential sampling error in this process. Such sampling error is not present in census surveys. However, if this study population could be considered to represent a random sample of some defined or undefined larger population, then these statistical tests would be appropriate.

CHAPTER VI

CONCLUSIONS

The purpose of this study was to examine the attitudes, experiences and satisfaction of both patients and dentists who participate in a program in which patients volunteer in their communities in exchange for dental treatment.

Patients' perceived oral health increased from before they began the program compared to when they completed the survey. In addition, the perceived importance that patients placed on their own oral health also increased from before beginning the program compared with when the survey was completed. These results imply program success in relation to positive perception. Pain was the main motivating factor for patients seeking treatment through the PIF Program. Additionally, patients volunteered an average of 33 hours in order to receive their dental treatment. On average their responses to their volunteering experience were positive and indicated that volunteering did not keep them from working, getting paid and spending time with their families.

Concerning whether the program participation improved patients' oral health-related quality of life is difficult to answer because no before and after assessments of patients' oral health-related quality of life were included in the survey. However, the poorer their subjective oral health had been before the program, the more positive was their oral health-related quality of life at the time of responding to the survey.

Those persons who did not follow through with program participation differed in their ethnic/racial background from those that did participate. Reflecting how to make dental programs more culturally sensitive to the needs of patients from underrepresented minority backgrounds might increase the likelihood of program participation of these patients.

In response to statements related to program evaluation, dentists' overall responses were positive that the program was innovative, rewarding, and that they found value in the program. Their open-ended responses provided additional insight for program improvement. Additional results of interest showed that while 50% of dentist participants accepted Medicaid insurance, those covered by Medicaid insurance only comprised an average of 1% of their patient populations, suggesting that increased acceptance of Medicaid insured patients is needed by dentists.

Overall, both participating patients and dentists liked the PIF Program. Patients perceived their dental treatment to be valuable and important, and perceived their volunteering experience to be rewarding. Dentists perceived the PIF Program to be innovative, rewarding and valuable, and they viewed their volunteering as a way of giving back to the community.

FIGURES

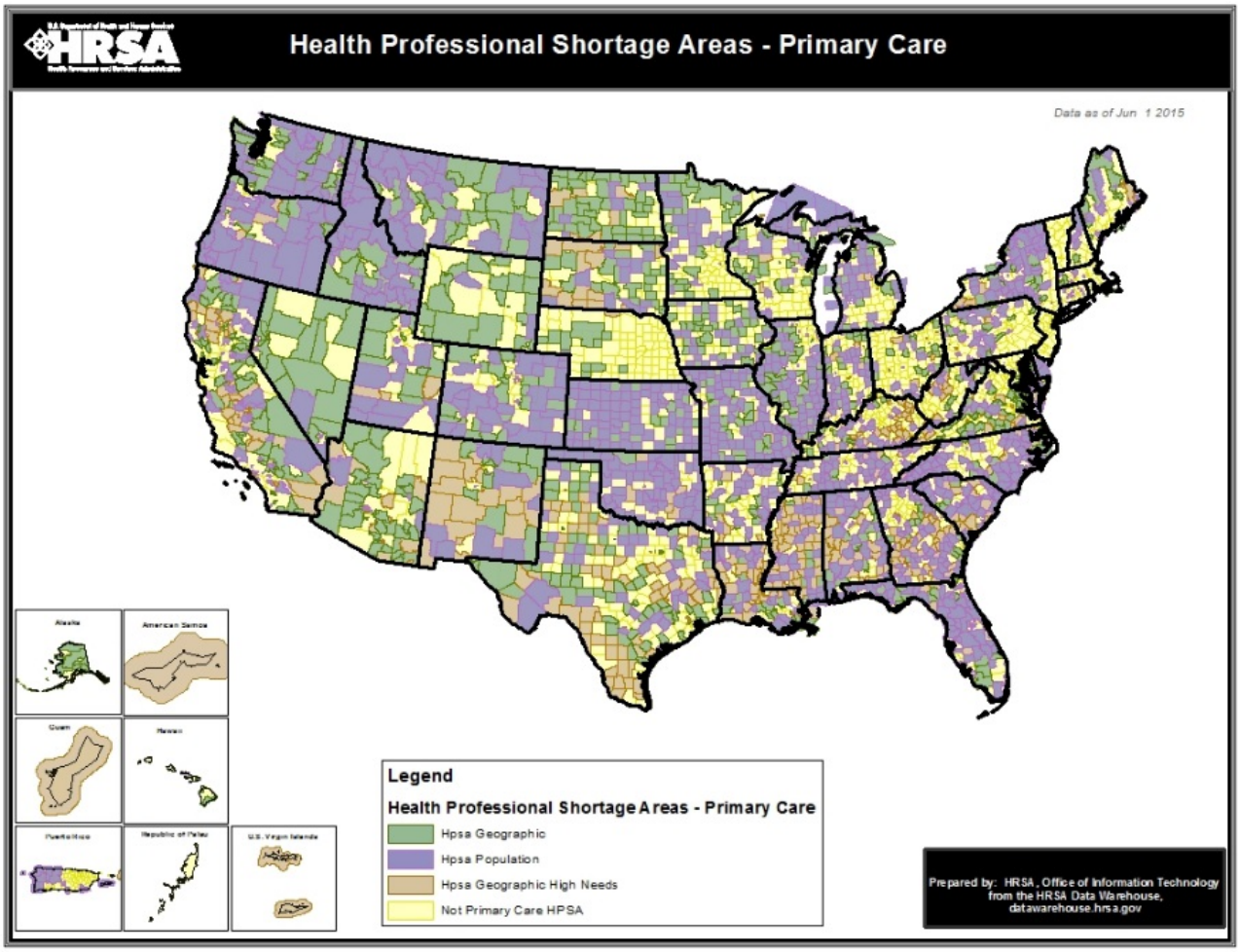
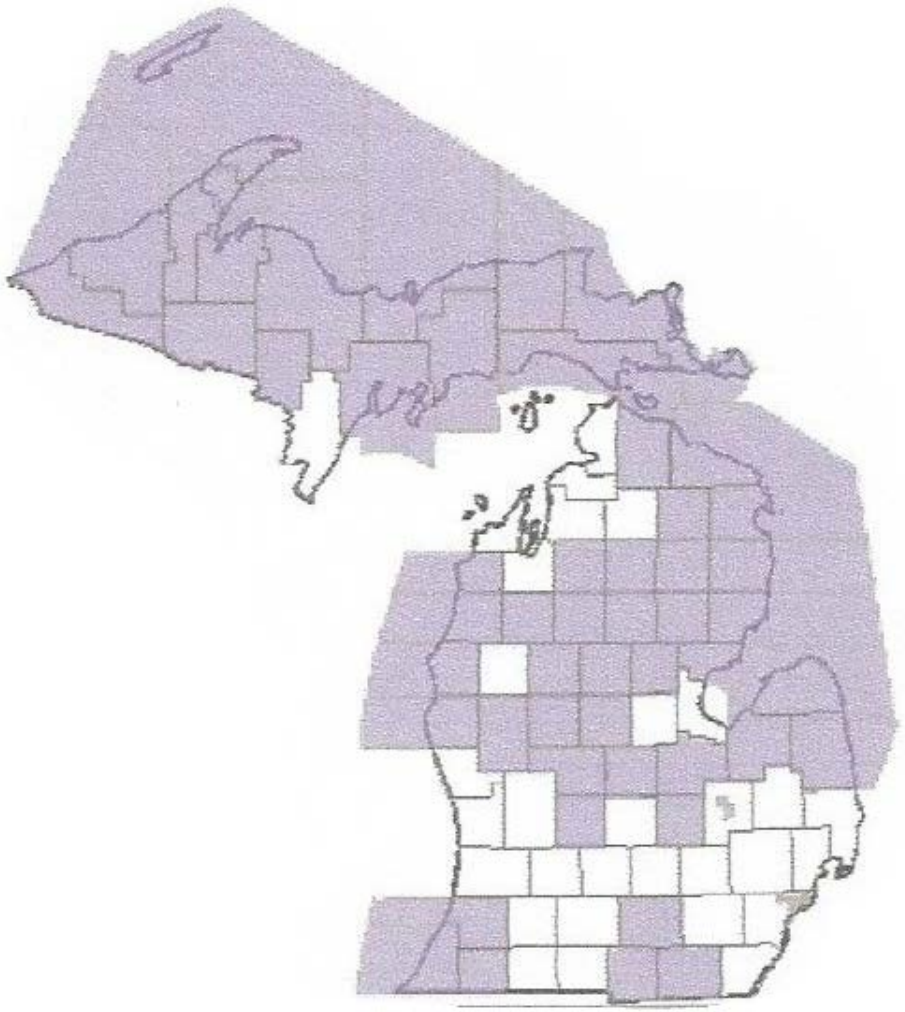


Figure 1. DHPSAs in the United States



*Areas shaded in purple represent DHPSAs

Figure 2. DHPSAs in Michigan by county

ORAL HEALTH FACTS	
HRSA Dental Health Professional Shortage Area	Yes
General Dentists	206
Pediatric Dentists	6
Specialty Dentists	37
Medicaid Dentists	50
Healthy Kids Dental Dentists	*Effective 10/01/13
Registered Dental Hygienists	218
Registered Dental Assistants	48
Collaborative Practice/Public Act 161	2
Medicaid Dental Coverage	Healthy Kids Dental Fee-for-Service, Adult
Safety Net Provider Program(s) CareFree Dental, Care Free Medical and Dental, Ingham Community Health Center-Dental, Ingham Community Health Center Healthy Smiles Dental, Lansing Community College Dental Hygiene Clinic	

Figure 3. Oral Health Facts for Ingham County, Michigan

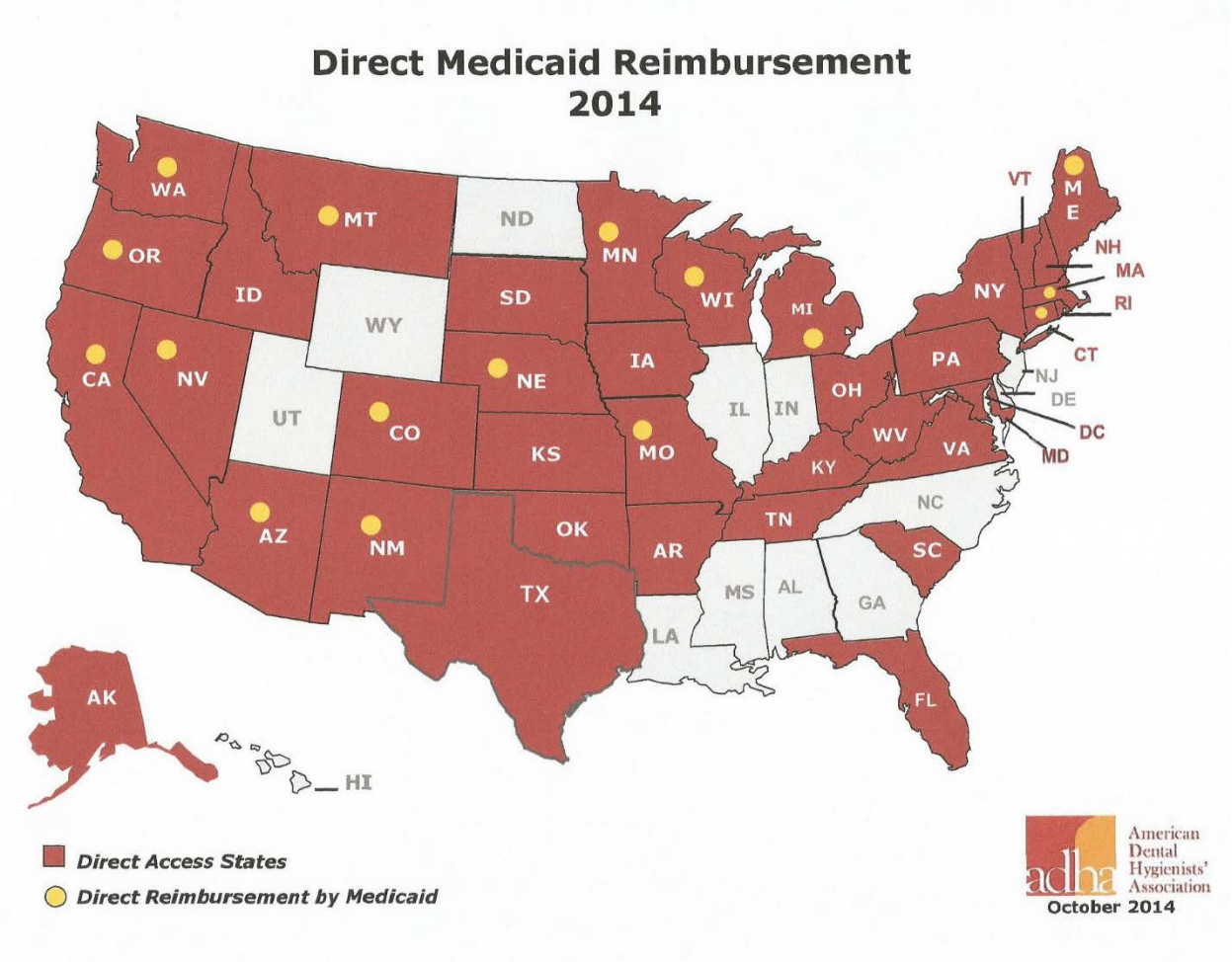


Figure 4. Direct Medicaid Reimbursement to Dental Hygienists

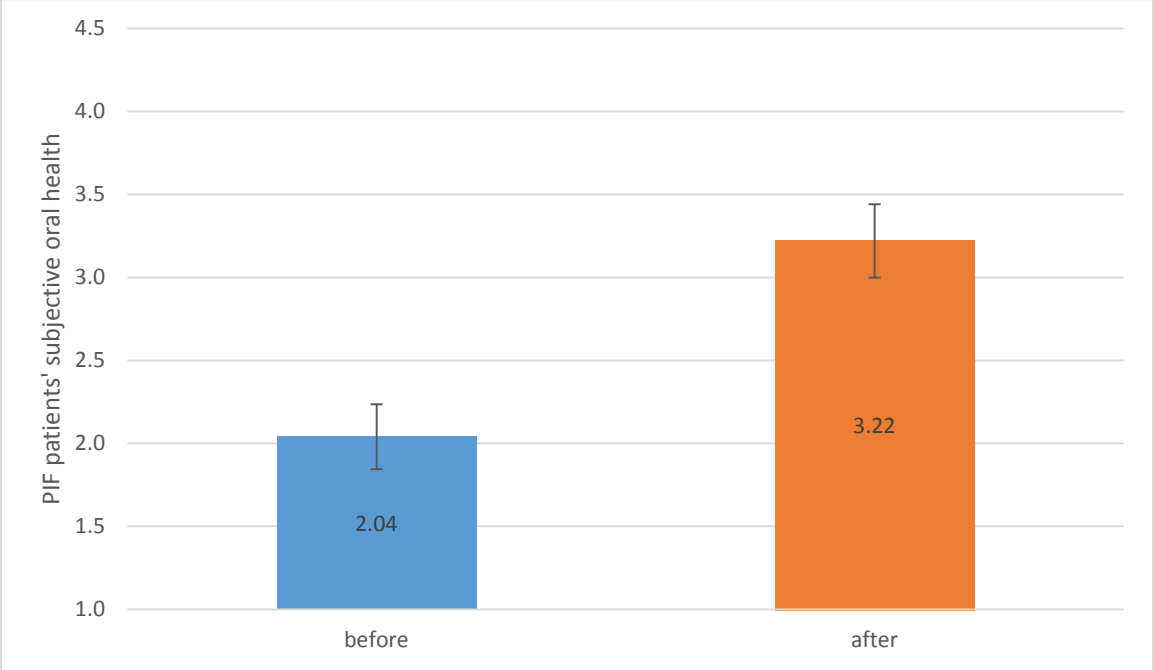


Figure 5. Patient responses regarding their perceived oral health *before* vs. *after* entering the Pay It Forward Program.

A paired samples t test was used to determine a p value of .001 for health of teeth and gums before PIF (SD±.898) vs. health of teeth and gums now (SD±1.013).

Legend: 1 = “poor”, 5 = “excellent”

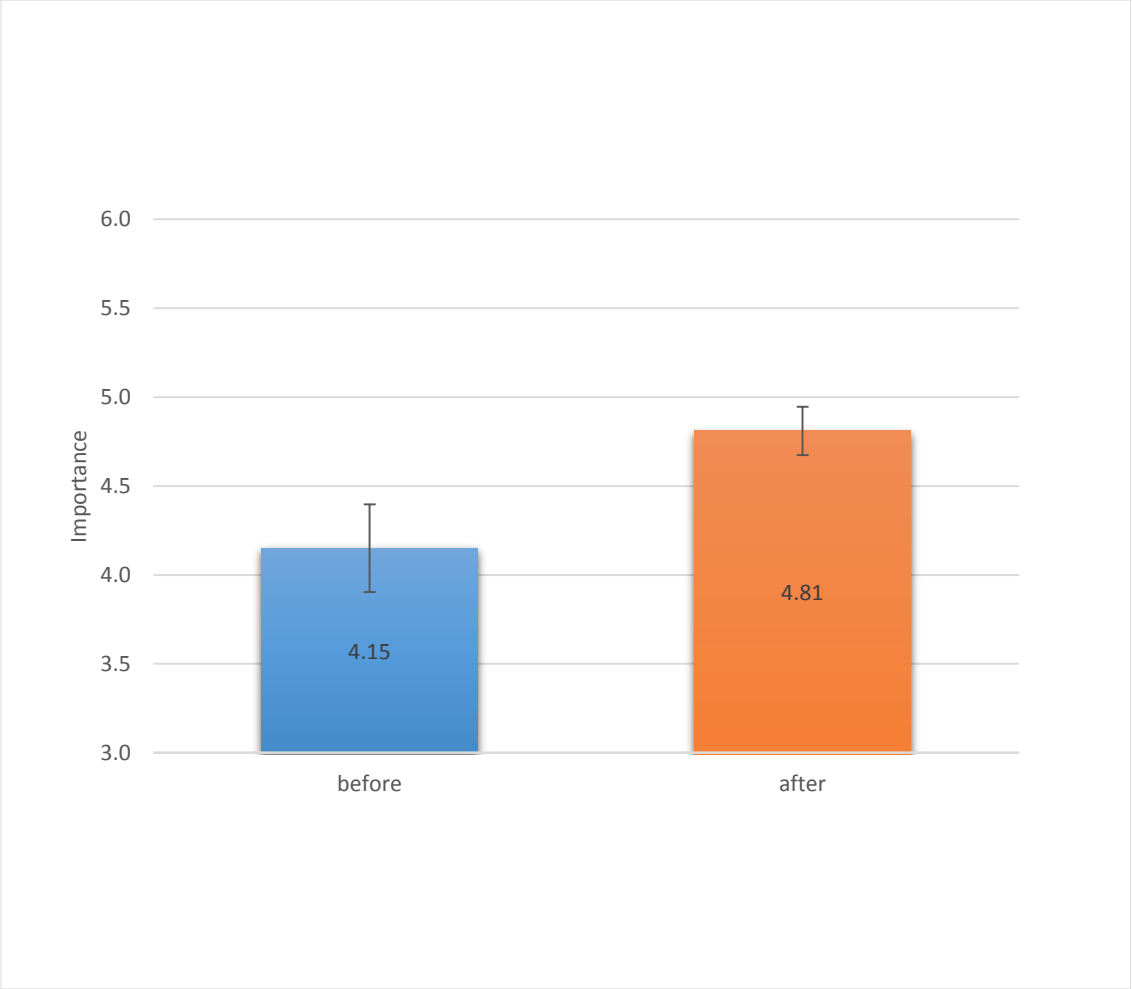


Figure 6. The *importance* patients placed on their oral health before vs. after entering the PIF Program

A paired samples t test was used to determine a p-value of .001 for importance of dental health before PIF (SD±1.134) vs. Importance of dental health now (SD±.622).

Legend: 1 = “not at all important”, 5 = “very important”

TABLES

Table 1a: Overview of the background characteristics of the patients who participated in the program (N=38) vs. did not participate (N=28)

Background characteristics	Participated N=38	No participation N=28	P	Originally interested N=66
Gender:				
- male	10	11	.542[1]	21
- female	17	17		34
Age:			.293[2]	
Mean, SD	46.08±16.493	44.34±13.821		45.33±15.309
- Range	22-75	23-70		22-75
Race:	N=25	N=18		N=43
- white	22 (88%)	9 (50%)	.035[1]	31 (72%)
- black	1 (4%)	2 (11%)		3 (7%)
- Hispanic	0 (0%)	4 (22%)		4 (9%)
- Asian	1 (4%)	1 (6%)		2 (5%)
- mixed	0 (0%)	2 (11%)		2 (5%)
- other	1 (4%)	0 (0%)		1 (2%)
Ethnicity:	N=32	N=17		N=49
- Hispanic	15 (47%)	7 (41%)	.469[1]	22 (45%)
- Not Hispanic	17 (53%)	10 (59%)		27 (55%)
Language:	N=35	N=19		N=54
- English	26 (74%)	15 (79%)	.260[1]	41 (76%)
- Spanish	8 (23%)	2 (11%)		10 (19%)
- Other	1 (3%)	2 (11%)		3 (6%)
Marital status:	N=34	N=26		N=60
- married	14 (41%)	11 (42%)	.246[1]	25 (42%)
- single	14 (41%)	15 (58%)		29 (48%)
- other	6 (18%)	0 (0%)		6 (10%)
Size of household:	4.44	2.84	.019[2]	2.38 ±1.68
Mean (SD) / range	3.157	1.740		1-8
Household income:	$2,102	$1,952	.836[2]	$1,879±1,853
Mean (SD) / range	2020	2539		0 – 10,500
Source of information about program:	N=24	N=20		N=44
- family	3 (13%)	8 (40%)	.010[1]	11 (25%)
- friend	7 (29%)	0 (0%)		7 (16%)
- news	5 (21%)	6 (30%)		11 (25%)
- Care Free website	2 (8%)	5 (25%)		7 (16%)
- other	7 (29%)	1 (5%)		8 (18%)
Bus to dentist: Yes	21 (81%)	n/a	-	-
Miles to dentist:	11.32±11.88	n/a	-	-
Mean (SD) / range	1 – 60.2			
Bus to Care Free: Yes	21 (81%)	13 (62%)	.134[1]	34 (72%)
Miles to Care Free	11.25±13.583	9.37±10.304	.598[2]	10.5±12.2
Mean (SD) / range	2.1-62.6	1.3 - 48		1.3 – 62.6

Legend:

1 Chi-square tests were used to determine whether the respondents who participated vs. did not participate differed in the frequencies of their responses.

2 Independent samples t tests were used to compare if the means of the two groups differed.

Table 1b: Overview of the background characteristics of the patient program participants who responded vs. did not respond to the survey

Background characteristics	Answered survey N=27	No survey response N=11	P	Participated N=38
Gender:				
- male	10 (37%)	2 (18%)	.231[1]	12 (32%)
- female	17 (63%)	9 (82%)		26 (68%)
Age:			.120[2]	
Mean, SD	48.74±17.094	39.55±13.441		46.08±16.493
- Range	22-75	23-65		22-75
Race:	N=18	N=7		N=25
- white	18 (100%)	4 (57%)		22 (88%)
- black	-	1 (14%)	.033[1]	1 (4%)
- Asian	-	1 (14%)		1 (4%)
- other	-	1 (14%)		1 (4%)
Ethnicity:	N=23	N=9		N=32
- Hispanic	12 (52%)	3 (33%)	.287[1]	15 (47%)
- Not Hispanic	11 (48%)	6 (67%)		17 (53%)
Language:	N=24	N=11		N=35
- English	16 (67%)	10 (91%)	.040[1]	26 (74%)
- Spanish	8 (33%)	0 (0%)		8 (23%)
- Other	0 (0%)	1 (9%)		1 (3%)
Marital status:	N=24	N=10		N=34
- married	11 (46%)	3 (30%)	.690[1]	14 (41%)
- single	9 (38%)	5 (50%)		14 (41%)
- other	4 (17%)	2 (20%)		6 (18%)
Size of household:			.039[2]	n/a
Mean (SD) / range	2.35 ±1.748	1.38±.744		
	1-5	1-2		
Household income:	$1,726±$1,009	2,067±2,568	.612[2]	n/a
Mean (SD) / range	0-5,100	0-10,500		
Source of information about program:	N=24	N=11	.994[1]	N=25
- family	3 (13%)	1 (9%)		4 (11%)
- friend	7 (29%)	3 (27%)		10 (29%)
- flyer	2 (8%)	1 (9%)		3 (9%)
- news	5 (21%)	3 (27%)		8 (23%)
- Facebook	1 (4%)	0 (0%)		1 (3%)
- Care Free website	2 (8%)	1 (9%)		3 (9%)
- other	4 (17%)	2 (18%)		6 (17%)
Bus to dentist: Yes	N=26	n/a	-	n/a
- yes	21 (81%)			
- no	5 (19%)			
Miles to dentist:	11.32 ±11.88	n/a	-	n/a
Mean (SD) / range	1-60.2			
Bus to Care Free: Yes	N=26	N=4	.612[1]	n/a
- yes	21 (81%)	3 (75%)		
- no	5 (19%)	1 (25%)		
Miles to Care Free:	N=26	N=4	3.90[2]	N=30
Mean (SD) / range	11.25 ±13.58	5.20±3.91		10.44±12.846
	2.10-62.60	2.80-11		2.10-62.60

Legend:

1 Chi-square tests were used to determine whether the respondents differed from the non-respondents in the frequencies of their responses.
2 Independent samples t tests were used to compare if the means of the two groups differed.

Table 2: Background responses of the patient survey respondents (N=27)

Background characteristics	Mean, SD	Range
Age:	48.74±17.09	22-75
Years of schooling:	13.69±4.49	3-21
	N	**%**
Gender:		
- male	10	37%
- female	17	63%
I am currently:		
- Working full-time	7	26%
- Working part-time	1	4%
- Unemployed	5	19%
- Homemaker	5	19%
- Other	1	4%
- Retired	6	22%
- On disability	2	7%

Descriptive statistics were used to determine the frequencies, percentages, mean, SD and range.

Note: The sum of the percentages may be over 100% due to rounding.

Table 3: Overview of oral health-related responses of patients

Oral health	1	2	3	4	5	Mean
Health of teeth and gums before PIF[1]	9 (33%)	9 (33%)	8 (30%)	1 (4%)	-	2.04
Health of teeth and gums now[1]	1 (4%)	6 (22%)	8 (30%)	10 (37%)	2 (7%)	3.22
Importance of dental health before PIF[2]	1 (4%)	2 (7%)	3 (11%)	7 (26%)	14 (52%)	4.15
Importance of dental health now[2]	1 (4%)	-	2 (7%)	-	24 (89%)	4.81
Denture: - partial: YES - full: YES	N 4 0	% 15% (0%)				
Frequency brushing[3]	-	-	3 (11%)	10 (37%)	14 (52%)	4.41
Frequency flossing[3]	-	8 (30%)	9 (33%)	6 (22%)	4 (15%)	3.22
Last dental visit before PIF[4]	-	9 (33%)	6 (22%)	7 (26%)	5 (19%)	3.30
Tx provided: YES - Cleaning - X-rays - Fillings - Extraction - Partial denture - Full denture - Other	N 17 12 8 7 0 0 0	% 63% 44% 30% 26% 0% 0% 0%				

Legend:

1 Answers ranged from 1 = “poor”, 2 = “fair”, 3 = “good”, 4 = “very good” to 5 = “excellent”.

2 Answers ranged from 1 = “not at all” to 5 = “very important”.

3 Answers ranged from 1 = “never”, 2 = “rarely”, 3 = “nearly every day”, 4 = “once a day” to 5 = “more than once a day”.

4 Answers ranged from 1 = “never”, 2 = “more than 5 years”, 3 = “3-5 years”, 4 = “1-2 years” to 5 = “less than 1 year”.

Descriptive statistics were used to determine the frequencies, percentages and mean.

Note: Treatment provided was a check all that apply question, therefore responses will be higher than 100%.

Table 4: Responses concerning patient participation in the Pay It Forward Program

Questions about the program participation	N	%
Pay It Forward Program participation:	YES:	
- Just registered for	0	0%
- Doing initial volunteer hours	5	19%
- Completed initial dentist appointment	8	30%
- Doing second round of volunteer hours	2	7%
- Dental treatment is partway finished	5	19%
- Dental treatment is all the way finished	6	22%
- Other	1	4%
What dental treatment did you think you needed when you heard about the program?	YES	
- Cleaning	24	89%
- X-rays	16	59%
- Fillings	18	67%
- Extraction	10	37%
- Other	3	11%
If "other," list treatment:		
- Bite splint	1	2%
- Deep cleaning	1	2%
- Root canal	1	2%
Did you have pain in your mouth when you heard about the program?	YES 19	70%
If yes, how much pain did you have?[1]	N=21 Mean=2.81	SD±1.078 Range=1-5
Where have you done your Pay It Forward volunteer hours?	N=32	
Church related volunteering:		
- Cristo Rey Church (Lansing, MI)	8	25%
- Beacon of Hope Family Care Missionary of FBC of St. Johns	1	3%
- Advent House Ministries	1	3%
School-related volunteering:		
- MSU	2	6%
- helping in Head Start	1	3%
- at a school	3	9%
Building improvement/construction		
- Habitat for Humanity	2	6%
- painting at Care Free	1	3%
Healthcare		
- Grace Hospice	1	3%
- Caring for elderly lady at my church	1	3%
Non-profit agencies		
- Capital Area Literacy Coalition	1	3%

- Capital City Film Festival	1	3%
- Greater Lansing Food Bank	1	3%
- Capital Area Humane Society	2	6%
- Goodwill	1	3%
Other		
- Fider Law	1	3%
- Mason Fairgrounds	1	3%
- Woldimen Nature Center	1	3%
- Lansing Police Department	1	3%
- all of them	1	3%
# hours volunteered?	N=21 Mean=33	SD±26.32 Range= 5-100
Have you volunteered anywhere before you joined this program?	YES 18	 69%
Type of treatment have you had as part of the Pay It Forward Program:	N=27	
- Oral health class	21	78%
- Cleaning	22	82%
- X-rays	23	85%
- Fillings	10	37%
- Extractions	10	37%
- Other	2	7%
If "other," list treatment:		
- deep cleaning	1	2%
- evaluation and suggestions	1	2%
- teeth bleaching	1	2%

Legend:

1 Answers ranged from 1 = "no pain", 2 = "little pain", 3 = "some pain", 4 = "a lot of pain" to 5 = "terrible pain".

Descriptive statistics were used to determine the frequencies, percentages, mean, SD and range.

Note: Questions regarding the treatment patients thought they needed and treatment received were check all that apply, therefore percentages will be over 100%.

Table 5: Overview of the oral health-related quality of life responses of patients

My teeth and gums[1]	1	2	3	4	5	Mean
limit the kinds or amounts of food I eat.	8 (31%)	6 (23%)	3 (12%)	4 (15%)	5 (19%)	2.69
cause discomfort.	7 (27%)	2 (8%)	7 (27%)	6 (23%)	4 (15%)	2.92
cause a lot of worry and concern.	10 (36%)	1 (4%)	5 (19%)	5 (19%)	5 (19%)	2.77
keep me from socializing/going out.	12 (46%)	5 (19%)	5 (19%)	3 (12%)	1 (4%)	2.08
make me uncomfortable when eating in front of others.	10 (40%)	7 (28%)	3 (12%)	3 (12%)	2 (8%)	2.20
make me uncomfortable when speaking in front of others.	11 (42%)	5 (19%)	5 (19%)	3 (12%)	2 (8%)	2.23
make me nervous.	12 (46%)	2 (8%)	5 (19%)	6 (23%)	1 (4%)	2.31
make me concerned about the way I look.	12 (46%)	2 (8%)	5 (19%)	4 (15%)	3 (12%)	2.38
keep me from enjoying life.	12 (46%)	4 (15%)	5 (19%)	4 (15%)	1 (4%)	2.15
interfere with my daily activities.	13 (50%)	5 (19%)	6 (23%)	1 (4%)	1 (4%)	1.92
interfere with my intimate relationship.	11 (44%)	3 (12%)	7 (28%)	3 (12%)	1 (4%)	2.20
have a bad effect on taste of food.	11 (42%)	2 (8%)	8 (31%)	4 (15%)	1 (4%)	2.31
reduce my general happiness with life.	9 (35%)	1 (4%)	7 (27%)	8 (31%)	1 (4%)	2.65
affect my life in all of its aspects.	7 (27%)	4 (15%)	5 (19%)	6 (23%)	4 (15%)	2.85

Legend:

1 Answers ranged from 1 = “strongly disagree”, 2 = “disagree”, 3 = “neutral”, 4 = “agree” to 5 = “strongly agree”.

Descriptive statistics were used to determine the frequencies, percentages and mean.

Table 6: Male vs. female oral health-related quality of life responses

Oral health	Male (N=10) Mean / SD	Female (N=17) Mean / SD	p
Health of teeth and gums before PIF[1]	1.80±.79	2.18±.95	.302[1]
Health of teeth and gums now[1]	2.90±1.10	3.41±.94	.211[1]
Importance of dental health before PIF[2]	4.00±1.25	4.24±1.09	.612[1]
Importance of dental health now[2]	5.00±.00	4.71±.77	.136[1]
Denture: - partial: YES - full: YES	 2 0	 2 0	 .477[2] -
Frequency brushing[3]	4.50±.71	4.35±.70	.605[1]
Frequency flossing[3]	3.10±1.20	3.29±.99	.652[1]
Last dental visit before PIF - < 1 year - 1-2 years - 3-5 years > 5 years	 3 2 2 3	 2 5 4 6	.698[2]
Tx provided in PIF: - oral health class - Cleaning - X-rays - Fillings - Extraction	 8 8 8 3 4	 13 14 15 7 6	 .613[2] .629[2] .477[2] .437[2] .563[2]
Oral health-related quality of life: My teeth and gums[4]	Male Mean/SD	Female Mean/SD	P-value[1]
limit the kinds or amounts of food I eat.	3.50±1.35	2.19±1.47	.032
cause discomfort.	3.60±1.17	2.50±1.46	.056
cause a lot of worry and concern.	3.40±1.65	2.38±1.50	.115
keep me from socializing/going out.	2.30±1.16	1.94±1.29	.476
make me uncomfortable when eating in front of others.	2.30±1.06	2.13±1.51	.765
make me uncomfortable when speaking in front of others.	2.40±1.35	2.13±1.36	.620
make me nervous.	2.60±1.51	2.13±1.31	.404
make me concerned about the way I look.	2.60±1.43	2.25±1.57	.573

keep me from enjoying life.	2.50±1.35	1.94±1.24	.287
interfere with my daily activities.	2.20±1.03	1.75±1.18	.333
interfere with my intimate relationship.	2.30±1.06	2.13±1.41	.753
have a bad effect on taste of food.	2.70±1.16	2.06±1.34	.227
reduce my general happiness with life.	3.00±1.25	2.44±1.41	.313
affect my life in all of its aspects.	3.00±1.05	2.75±1.69	.647

Legend:

1 Answers ranged from 1 = “poor”, 2 = “fair”, 3 = “good”, 4 = “very good” to 5 = “excellent”.
2 Answers ranged from 1 = “not at all” to 5 = “very important”.
3 Answers ranged from 1 = “never”, 2 = “rarely”, 3 = “nearly every day”, 4 = “once a day” to 5 = “more than once a day”.
4 Answers ranged from 1 = “disagree strongly” to 5 = “agree strongly”.

P-value Legend:

1 Chi Square tests were used to determine whether males vs. females differed in the frequencies of their responses.
2 Independent samples t tests were used to compare if the means of the two groups differed.

Table 7: Pearson correlations between patient program participation and oral health-related quality of life responses

Oral health-related responses	Stage of program participa-tion	Average oral health-related quality of life[1]	Health of teeth and gums		Importance of dental health	
			before PIF program	now	before PIF program	now
Average oral health-related quality of life[2]	-.17	1				
Health of teeth and gums before PIF program[3]	.29	-.60 *P=.002	1			
Health of teeth and gums now[3]	08	-.20	.20	1		
Importance of dental health before PIF program[4]	.49 **P=.011	-.41 **P=.046	.56 *P=.002	.14	1	
Importance of dental health now[4]	.24	-.24	.29	.31	.53 *P=.004	1
Frequency of brushing teeth[5]	.39 P=.050	-.03	.47 **P=.014	-.08	.56 *P=.003	.45 **P=.019
Frequency of flossing teeth[5]	.43 **P=.030	-.03	.07	.28	.17	.30

Legend:

1 Answers ranged from: 1 = “Just registered for program”, 2 = “Doing initial volunteer hours”, 3 = “Completed initial dentist appointment”, 4 = “Doing second round of volunteer hours”, 5 = “Dental treatment is partway finished” to 6 = “Dental treatment is all the way finished”.
2 Answers ranged from: 1 = “best quality of life” to 5 = “poorest quality of life”.
3 Answers ranged from: 1 = “poor” to 5 = “excellent”.
4 Answers ranged from: 1 = “not at all important” to 5 = “very important”.
5 Answers ranged from: 1 = “never” to 5 = “2 or more times per day”.

Pearson correlation coefficients were used to determine whether relationships exist between program participation and oral health related responses.

*Indicates p-value is ≤ 0.01
**Indicates p-value is ≤ 0.05

Table 8: Patient evaluations of the Pay It Forward program

Program evaluations	1	2	3	4	5	Mean
I like to volunteer for getting my dental care.	6 (23%)	0	0	2 (8%)	18 (69%)	4.00
Volunteering is not difficult.	6 (23%)	0	1 (4%)	3 (12%)	16 (62%)	3.88
Volunteering keeps me from working & getting paid	12 (48%)	5 (20%)	5 (20%)	1 (4%)	2 (8%)	2.04
Volunteering takes away time from my family.	14 (54%)	8 (31%)	1 (4%)	0	3 (12%)	1.85
The health education classes are interesting.	6 (24%)	1 (4%)	4 (16%)	6 (24%)	8 (32%)	3.36
The health education class was helpful.	6 (24%)	0	3 (12%)	7 (28%)	9 (36%)	3.52
The dentist & staff treat me well.	5 (19%)	1 (4%)	0	0	20 (77%)	4.12
The dentist & staff provide good care.	5 (19%)	1 (4%)	0	2 (7%)	19 (70%)	4.07
The dentist & staff treat me with respect.	5 (19%)	1 (4%)	0	1 (4%)	19 (73%)	4.08
I had to wait too long to begin my dental treatment in the program.	10 (37%)	8 (30%)	7 (26%)	1 (4%)	1 (4%)	2.07
I want to stay in the program.	5 (19%)	0	5 (19%)	2 (7%)	15 (56%)	3.81
The Pay It Forward Program helps me a lot.	5 (19%)	0	0	2 (7%)	20 (74%)	4.19
I like the Pay It Forward Program.	5 (19)	0	0	1 (4%)	21 (78%)	4.22
I would recommend the program to family members.	5 (19%)	0	1 (4%)	1 (4%)	20 (74%)	4.15
I would recommend the program to friends.	5 (19%)	0	1 (4%)	1 (4%)	20 (74%)	4.15

Legend:

1 Answers ranged from 1 = “strongly disagree”, 2 = “disagree”, 3 = “neutral”, 4 = “agree” to 5 = “strongly agree”.

Descriptive statistics were used to determine the mean, frequencies and percentages.

Table 9: Correlations between program evaluations and stage of program participation, and between program evaluations and dollar amount of treatment received.

Program evaluations[1]	Stage in PIF program[2] R=	Total Charges R=
I like to volunteer	.21[3]	.17[4]
Volunteering is not difficult	.21	.15
Volunteering keeps me from working /getting paid.	-.23	-.31
Volunteering takes away time from my family	-.27	-.13
The health education classes are interesting.	.22	.15
Health education classes are helpful.	.22	.10
Dentist and staff treat me well.	.29	.10
Dentist & staff provide good care	.29	.12
Dentist & staff treat me with respect.	.32	.11
I had to wait too long to begin tx..	-.17	-.22
I want to stay in the program.	.10	-.02
PIF program helps me a lot.	.37	.11
I the like PIF program.	.35	.09
I would recommend program to family members.	.33	.11
I would recommend program to friends.	.33	.11

Legend:

1 Answers ranged from 1 = “strongly disagree” to 5 = “strongly agree”.

2 Answers ranged from 1 = “Just registered for program”, 2 = “Doing initial volunteer hours”, 3 = “Completed initial dentist appointment”, 4 = “Doing second round of volunteer hours”, 5 = “Dental treatment is partway finished” to 6 = “Dental treatment is all the way finished”.

3 Pearson correlation coefficients were used to determine the relationship between “Stage in program” and the program evaluation responses.

4 Pearson correlation coefficients were used to determine the relationship between program evaluation responses and dollar amount of treatment provided.

None of the correlations in this table reached statistical significance, therefore, p-values are not given.

Table 10: Patient response to the open ended question: "Please tell us what you like about the Pay It Forward Program."

Answers	Rater 1		Rater 2	
	N	%	N	%
everything	10	26%	10	26%
dental care and education	10	26%	9	26%
Affordable/free/cost/ financial	8	22%	7	22%
I like volunteering	7	18%	7	18%
no dental insurance	5	13%	4	13%
professional staff	4	11%	4	11%
volunteering helps community	2	5%	2	5%
Kind, caring staff	4	11%	4	11%
Educates people regarding their oral health	2	5%	2	5%
I was treated as a regular patient	1	3%	1	3%
Total	53		50	
Number of responses:				
No response	1	4%	1	4%
1 response	7	28%	7	28%
2 responses	8	32%	7	28%
3 responses	6	24%	4	24%
4 responses	3	12%	3	12%
5 responses	0	0%	1	4%

Descriptive qualitative frequencies were used to show the number and percentages of answers to the above open-ended question.

Open ended responses were coded into themes by two independent raters

Note: Raters may have determined two or more separate responses out of one statement, therefore the total number of responses are different for each rater.

Table 11: Patient response to the open ended question: "Please tell us about anything you <u>do not like</u> about the Pay It Forward Program."

Answers	Rater 1		Rater 2	
	N	%	N	%
Nothing I dislike	13	57%	13	57%
Communication with staff	4	17%	4	17%
Limited treatment offered	3	13%	3	13%
Waiting for treatment	2	9%	2	9%
Process too complicated	1	3%	1	3%
Total	23		23	
Number of responses: No response 1 response 2 responses	 3 21 1	 12% 84% 4%	 3 21 1	 12% 84% 4%

Descriptive qualitative frequencies were used to show the number and percentages of answers to the above open-ended question.

Open ended responses were coded into themes by two independent raters

Table 12: Patient response to the open ended question: "Please tell us what you might change about the program to make it better."

Answers	Rater 1		Rater 2	
	N	%	N	%
Everything is good	10	40%	10	40%
Promote program more / increase participation	3	12%	3	12%
Offer more comprehensive tx	3	12%	3	12%
Update web, fax# Offer forms to be downloaded	2	8%	1	4%
Thank you	2	8%	2	8%
Connect patient with volunteer agency immediately	1	4%	1	4%
Better communication by Care Free	1	4%	2	8%
Give recognition to all professional volunteers	1	4%	1	4%
Inform patients of all volunteer hours needed before initial cleaning	1	4%	1	4%
Would like to have call returned by next business day	1	4%	1	4%
Total	25		25	
Number of responses:				
No response	5	20%	5	20%
1 response	17	72%	17	72%
2 responses	1	4%	1	4%
3 responses	2	8%	2	8%

Descriptive qualitative frequencies were used to show the number and percentages of answers to the above open-ended question.

Open ended responses were coded into themes by two independent raters

Note: Raters may have determined two separate responses out of one statement, therefore the total number of responses are different for each rater.

Table 13: Dentists' background responses

Background characteristics	
Gender: - male - female	N=9 8(89%) 1(11%)
Age: Mean (SD) / Range	57.11±10.47 32-67
Race/ethnicity - Caucasian - Bi-racial - other	N=9 8(80%) 1(10%) 1(10%)
Professional characteristics	
How long have you practiced dentistry? Mean (SD) / Range	29.50±10.16 6-43
Did you receive any graduate/specialty training? - yes If yes: which? - lots of CE - Oral & Maxillofacial surgery - Orthodontics	N=9 2(22%) 1(10%) 1(10%) 1(10%)
practice / employment situation: - Solo practice - Partnership - Other (please, specify): - Associateship	N=10 7(70%) 2(20%) 1(10%)
Dentists accepts - Medicaid - Yes - Private pay - Yes - Dental insurance - Yes	 5(50%) 10(100%) 10(100%)
% patients covered by - Medicaid - Private Insurance - Pay out of pocket	Mean(SD)/range 1%±2.12 0-5% 78%±7.81 70-90% 21%±7.82 10-30%
# days working per week - 2 days - 3 days - 4 days - 4.5 days - 5 days	N=10 1(10%) 2(20%) 4(40%) 2(20%) 1(10%)
# patients treated in average week Mean (SD) range	N=8 78±50.86 24-160

Descriptive statistics were used to determine the frequencies, percentages, mean, SD and range.

Table 14: Dentist responses related to participating in the Pay It Forward Program

Questions about program participation	N/%
- How long have you participated in PIF?	
- 3 months	1(10%)
- 4 months	1(10%)
- 5 months	1(10%)
- 6 months	2(20%)
- 12 months	1(10%)
- 14 months	1(10%)
- 24 months	3(30%)
Mean (SD) / range	12.2±8.83 3-24
Have you ever volunteered your dental services before you joined the PIF program?	N=10
- yes	9(90%)
If yes, please list other volunteer activities:	
- Care Free Clinic	6(67%)
- Donated Dental Services	4(44%)
- pro bono	2(22%)
- Ingham County Health Dept.	1(11%)
- LCC kids	1(11%)
- MDA	1(11%)
- Medical Access Program	1(11%)
- Missions of Mercy	1(11%)
- Church Program	1(11%)
How many pro bono cases have you taken on in 2014 other than from PIF?	N=10
- 0	1(10%)
- 2	2(20%)
- 2-3	2(20%)
- 3	1(10%)
- 5-10	1(10%)
- 25	1(10%)
- 30	1(10%)
- several	1(10%)
How many PIF patients have you treated so far?	N=10
- 1	1(10%)
- 2	3(30%)
- 3	2(20%)
- 4	2(20%)
- 8	1(10%)
- 10	1(10%)
How did you hear about the PIF program?	N=9
- Through dental society	2(22%)
- From Care Free	5(56%)
- Another dental professional	1(11%)
- Was a founder of PIF Program	1(11%)

Why did you decide to volunteer in the PIF program? Please explain: - Believed it was a good idea/model - So much need in Ingham County, and I want to help people to access dental care - Allows me to give back, yet work from my own office	N=8 4(50%) 2(25%) 2(25%)
Describe the average oral health of the last PIF patient for whom you provided an initial exam: - poor - fair - good	N=8 2(25%) 1(13%) 5(63%)
Which dental treatments have you provided through PIF so far? - Prophylaxis/Perio Therapy - X-rays - Fillings - Extractions - bridge - maxillary and mandibular partials - root canal	N=9 8(89%) 9(100%) 8(89%) 6(67%) 1(11%) 2(22%) 2(22%)

Descriptive statistics were used to determine the frequencies, percentages, mean, SD and range.

Note: above question was check all answers that apply, therefore percentages will total over 100%.

Table 15: Frequencies of Dentist responses to program evaluation questions

Program evaluations	1	2	3	4	5	N= Mean
I like the PIF program.	0 0%	2 22%	0 0%	2 22%	5 56%	9 4.11
The PIF program is an innovative way of addressing access to care problems.	2 22%	0 0%	0 0%	3 33%	4 44%	9 3.78
Volunteering for this program is rewarding.	1 11%	1 11%	0 0%	3 33%	4 44%	9 3.89
I like to give back to my community.	2 22%	0 0%	0 0%	3 33%	4 44%	9 3.78
The patient(s) in the program appreciate my help.	1 11%	2 22%	0 0%	1 11%	5 56%	9 3.78
The patient(s) are on time.	1 11%	1 11%	2 22%	1 11%	4 44%	9 3.67
I would recommend the program to my colleagues.	1 11%	1 11%	1 11%	2 22%	4 44%	9 3.88
My staff members find value in the program.	0 0%	2 22%	0 0%	2 22%	5 56%	9 4.11
My staff members like the program.	0 0%	1 11%	1 11%	3 33%	4 44%	9 4.11
I will continue to volunteer with the program.	0 0%	2 22%	0 0%	2 22%	5 56%	9 4.11
I would recommend participation in the program to other dentists.	0 0%	2 22%	0 0%	3 33%	4 44%	9 4.00

Legend:

1 Answers ranged from 1 = “strongly disagree”, 2 = “disagree”, 3 = “neutral”, 4 = “agree” to 5 = “strongly agree”.

Descriptive statistics were used to determine the frequencies, percentages and mean.

Table 16: Frequencies of Dentist responses to the open ended question: "Please tell us <u>what you like</u> about the PIF program."

Answers	Rater 1		Rater 2	
	N	%	N	%
Patient volunteers/donates time to earn/ invest in their care	8	80%	8	80%
Helps the community	3	30%	3	30%
I can work from my own office	2	20%	2	20%
Patients are on time	1	10%	1	10%
Volunteerism demonstrates investment in their care	0	0%	2	20%
Do not need to make prolonged commitment to patient	1	10%	1	10%
Pre-enrollment education of patient	1	10%	1	10%
Total	16		18	
Number of responses: 1 response 2 responses 3 responses	 6 2 2	 60% 20% 20%	 4 4 2	 40% 40% 20%

Descriptive qualitative frequencies were used to show the number and percentages of answers to the above open-ended question.

Open ended responses were coded into themes by two independent raters

Table 17: Dentist responses to the open-ended question: "Please tell us about any concerns you have about the PIF Program."

Answers	Rater 1		Rater 2	
	N	%	N	%
tie volunteer hours to a specific agency and/or within dentists' community	2	20%	2	20%
not assigned many patients	1	10%	1	10%
unsure when relationship with patient ends	1	10%	1	10%
not comprehensive enough	1	10%	1	10%
no concerns	2	20%	1	10%
Selection of patient concern	1	10%	1	10%
Total	8		7	
Number of responses: No response 1 response	 2 8	 20% 80%	 3 7	 30% 70%

Descriptive qualitative frequencies were used to show the number and percentages of answers to the above open-ended question.

Open ended responses were coded into themes by two independent raters

Table 18: Dentist responses to the open-ended question: "Please provide any suggestions you have for improving the program in the future."

Answers	Rater 1		Rater 2	
	N	%	N	%
great program	2	20%	1	10%
find a lab to participate so that more extensive treatment can be offered	1	10%	1	10%
offer CE credits to participating dentists	1	10%	1	10%
figure out a solution to clarify when relationship with patient ends	1	10%	1	10%
if hospitals are being relieved of financial burden, then they should contribute to the program	1	10%	1	10%
Have patients provide community service in the providing dentist's community	1	10%	1	10%
Total	7		6	
Number of responses:				
No response	4	40%	4	40%
1 response	5	50%	4	40%
2 responses	1	10%	2	20%

Descriptive qualitative frequencies were used to show the number and percentages of answers to the above open-ended question.

Open ended responses were coded into themes by two independent raters

Table 19: Overview of the dollar amount associated with the services provided

Dollar Amount	Frequency
.00	4
195.00	2
255.00	1
257.00	1
300.00	1
405.00	1
471.00	1
591.00	1
595.00	1
602.00	1
605.00	2
666.00	1
784.00	1
854.00	1
857.00	1
866.00	1
884.00	1
1,040.00	1
1,082.00	1
1,466.00	1
1,585.00	1
1,612.00	1
1,739.00	1
1,848.00	1
1,853.00	1
1,907.00	1
1,919.00	1
1,995.00	1
2,165.00	1
2,425.00	1
2,565.00	1
3,571.00	1
5,056.00	1
Mean/SD	1,153±1,067.5
Grand Total	$43,815

Descriptive statistics were used to determine the frequencies, mean and SD.

Table 20: Overview of the types of dental treatment provided

Type and number of Treatments	Frequency (%)
Prophylaxis	
- 0	15(40%)
- 1	20(53%)
- 2	1(3%)
- 3	1(3%)
- 4	1(3%)
New pt. exam	
- 0	8(21%)
- 1	30(79%)
Periodic exam	
- 0	31(82%)
- 1	5(13%)
- 2	1(3%)
- 3	1(3%)
Emergency exam	
- 0	35(92%)
- 1	3(8%)
Panoramic X-ray	
- 1	7(18%)
Full Mouth Series	
- 1	18(47%)
Periapical X-ray	
- 1	3(8%)
- 2	1(3%)
- 3	1(3%)
BWX-ray	
- 1	12(32%)
Anterior composites	20(53%)
Posterior composites	14(37%)
Posterior amalgams	11(29%)
Extractions	15(40%)
SC/RP	
- 2 quadrants	2(5%)
- 3 quadrants	1(3%)
- 4 quadrants	5(13%)
Root Canal Therapy	
- Anterior	1(3%)
- Posterior	3(8%)
Core Build Up	7(18%)
Partial Dentures	
- Maxillary	1(3%)
- Mandibular	1(3%)
Crown	2(5%)
4 Unit Bridge	1(3%)
Other	7(18%)

Frequency distributions were used to show the number and types of treatment provided.

APPENDIX A

Patient Recruitment Cover Letter

Dear Pay It Forward Patient,

I am a dental hygienist in school for additional education and training at the University of Michigan (U-M). With the help of Care Free Dental, I am doing a survey to see what you think about the Pay It Forward Program. The survey asks questions about your volunteering, how happy you are with your dental treatment, and about the program overall. Your answers will be helpful to understand how the Pay It Forward Dental Program works and how it can be improved. The U-M Institutional Review Board (IRB) reviews all projects like this to make sure the rights of those taking the survey are protected. It has approved this project.

Taking this survey is voluntary. Your responses are confidential. Your name will not appear on any material connected with your answers. You may stop taking the survey at any time. It will take about 15 minutes to complete the survey. A Spanish copy of the survey is included as well so feel free to use that version if you prefer.

Please complete this survey by **April 1st, 2015.** Put it in the self-addressed, stamped envelope and place it in the mail. As a special thank you for doing this, you will receive 2 volunteer hours towards your dental treatment. Once your survey is returned, a certificate for these 2 hours will be mailed to you.

Please contact Lorene Kline at 586-382-1701 (lorkline@umich.edu) or Audrey Taylor at 517-272-5053 (ataylor@carefreemedical.org) if you have any questions.

Thank you,

Lorene Kline, RDH, BSDH
Master of Science in Dental Hygiene Program
University of Michigan School of Dentistry
1011 N. University, Room 3066
Ann Arbor, MI 48109-1098

Audrey Taylor, RDH, BSDH
Dental Clinic Administrator
Care Free Dental
5135 S. Pennsylvania Ave
Lansing, MI 48911-4002

APPENDIX B

UNIVERSITY OF MICHIGAN – SCHOOL OF DENTISTRY & CARE FREE DENTAL
Pay It Forward Program Patient Survey

ID Number: _____

Thank you very much for filling out this questionnaire. We want to assure you that all your answers are strictly confidential. Your name will not appear on any material connected with your answers.

1. Are you male ❑ or female ❑ ?

2. How old are you? I am_____years old.

3. How many years of schooling have you had starting with first grade? _____

4. I am currently……?

Working full-time ❑ Working part-time ❑ Unemployed ❑
Homemaker ❑ Other ❑
If "other," please explain

_____

6. Where are you in the Pay It Forward Program? (Check one)

Just registered for program ❑
Doing initial volunteer hours ❑
Completed initial dentist appointment ❑
Doing second round of volunteer hours ❑
Dental treatment is partway finished ❑
Dental treatment is all the way finished ❑
Other ❑
If "other," please explain

<u>The following questions ask you about your teeth and dental health:</u>

D1. How would you describe the health of your teeth and gums <u>before</u> you began the Pay It Forward Program?

❑1	❑2	❑3	❑4	❑5
poor	fair	good	very good	excellent

D2. How would you describe the health of your teeth and gums <u>at the moment</u>?

❑1	❑2	❑3	❑4	❑5
poor	fair	good	very good	excellent

D3. How important was your dental health to you <u>before</u> you began the Pay It Forward Program?

❑1	❑2	❑3	❑4	❑5
Not at all				**Very important**

D4. How important is your dental health to you <u>at the moment</u>?

❑1	❑2	❑3	❑4	❑5
Not at all				**Very important**

D5. Do you have a partial or full denture? If yes, check which one:

Partial denture (replaces a few teeth) ❑ **Full denture** (replaces all top or bottom teeth) ❑

D6. How often do you brush your teeth?

❑1	❑2	❑3	❑4	❑5
never	**rarely**	**nearly every day**	**every day**	**more than once a day**

D7. How often do you floss your teeth?

❑1	❑2	❑3	❑4	❑5
never	**rarely**	**nearly every day**	**every day**	**more than once a day**

D8. When was your last dental visit before you joined the Pay It Forward Program?

❑1	❑2	❑3	❑4	❑5
never	**more than 5 years**	**3-5 years**	**1-2 years**	**less than 1 year**

D9. What was done at your last dental visit before you joined the program?

Cleaning ❑ **X-rays** ❑ **Fillings** ❑

Teeth pulled ❑ **Partial denture** (replaces a few teeth) ❑

Full denture (replaces all top or bottom teeth) ❑ **Other** ❑

If "other," list treatment:

_____

The following questions are about the Pay It Forward Program:

P1. What dental treatment did you think you needed when you heard about the program?

Cleaning ❑ X-rays ❑ Fillings ❑
Teeth pulled ❑ Other ❑
If "other," list treatment:

P2. Did you have pain in your mouth (toothache, gums hurt, etc) when you heard about the program?
Yes ❑ No ❑

P3. If yes, how much pain did you have?

❑1	❑2	❑3	❑4	❑5
no pain	little pain	some pain	a lot of pain	terrible pain

P4. So far, where have you done your Pay It Forward volunteer hours?

P5. How many hours have you volunteered so far?_____hours

P6. Have you ever volunteer anywhere before you joined this program? Yes ❑ No ❑

P7. What type of dental treatment have you had as part of the Pay It Forward Program? Please check all that you have had:

Oral health class ❑ Cleaning ❑ X-rays ❑ Fillings ❑
Teeth pulled ❑ Other ❑
If "other," list treatment:

_____

The next questions are about your dental health and how it affects your life.

P8. Please tell us, how much do you agree / disagree with the following statements.

	strongly disagree	disagree	neutral	agree	strongly agree
My teeth and gums limit the kinds or amounts of food I eat.	❑1	❑2	❑3	❑4	❑5
My teeth and gums cause discomfort.	❑1	❑2	❑3	❑4	❑5
My teeth and gums cause a lot of worry and concern.	❑1	❑2	❑3	❑4	❑5
My teeth and gums keep me from socializing/going out.	❑1	❑2	❑3	❑4	❑5
My teeth and gums make me uncomfortable when eating in front of others.	❑1	❑2	❑3	❑4	❑5
My teeth and gums make me uncomfortable when speaking in front of others.	❑1	❑2	❑3	❑4	❑5
My teeth and gums make me nervous.	❑1	❑2	❑3	❑4	❑5
My teeth and gums make me concerned about the way I look.	❑1	❑2	❑3	❑4	❑5
My teeth and gums keep me from enjoying life.	❑1	❑2	❑3	❑4	❑5
My teeth and gums interfere with my daily activities.	❑1	❑2	❑3	❑4	❑5
My teeth and gums interfere with my intimate relationship.	❑1	❑2	❑3	❑4	❑5
My teeth and gums have a bad effect on taste of food.	❑1	❑2	❑3	❑4	❑5
My teeth and gums reduce my general happiness with life.	❑1	❑2	❑3	❑4	❑5
My teeth and gums affect my life in all of its aspects.	❑1	❑2	❑3	❑4	❑5

The final questions are about how you like the Pay It Forward program and what changes you think might be made:

P9. How much do you disagree / agree with the following statements?

	strongly disagree	disagree	neutral	agree	strongly agree
I like to volunteer for getting my dental care.	❑1	❑2	❑3	❑4	❑5
Volunteering is not difficult.	❑1	❑2	❑3	❑4	❑5
Volunteering keeps me from working & getting paid.	❑1	❑2	❑3	❑4	❑5
Volunteering takes away time from my family.	❑1	❑2	❑3	❑4	❑5
The health education classes are interesting.	❑1	❑2	❑3	❑4	❑5
The health education class was helpful.	❑1	❑2	❑3	❑4	❑5
The dentist & staff treat me well.	❑1	❑2	❑3	❑4	❑5

	strongly disagree	disagree	neutral	agree	strongly

	strongly disagree	disagree	neutral	agree	strongly agree	disagree
The dentist & staff provide good care.	❑1	❑2	❑3	❑4	❑5	
The dentist & staff treat me with respect.	❑1	❑2	❑3	❑4	❑5	
I had to wait too long to begin my dental treatment in the program.	❑1	❑2	❑3	❑4	❑5	
I want to stay in the program.	❑1	❑2	❑3	❑4	❑5	
The Pay It Forward Program helps me a lot.	❑1	❑2	❑3	❑4	❑5	
I like the Pay It Forward Program.	❑1	❑2	❑3	❑4	❑5	
I would recommend the program to family members.	❑1	❑2	❑3	❑4	❑5	
I would recommend the program to friends.	❑1	❑2	❑3	❑4	❑5	

P10. Please tell us what you like about the Pay It Forward Program.

P11. Please tell us about anything you do not like about the Pay It Forward Program.

P12. Please tell us what you might change about the program to make it better.

Thank you very much for answering these questions. If you have any question concerning this questionnaire, please contact Lorene Kline at telephone number (586) 382-1701 or at email lorkline@umich.edu.

APPENDIX C

Patient Recruitment Cover Letter (Spanish Version)

Estimado Pay It Forward Paciente,

Soy una higienista dental y estoy en la Universidad de Michigan (U-M) para una mejor educación avanzada y entrenamiento. Con la ayuda de Atención Gratuita Dental, estoy haciendo una encuesta para ver lo que usted piensa acerca del Programa Pay It Forward. La encuesta hace preguntas sobre su trabajo voluntario, lo feliz que está con su tratamiento dental, y sobre el programa en general. Sus respuestas serán útiles para entender cómo funciona el Programa Dental Pay It Forward y cómo se puede mejorar. La Junta de Revisión Institucional de la U-M (IRB) revisa todos los proyectos como éste para asegurarse de que los derechos de los que tomaron la encuesta están protegidos. Se ha aprobado este proyecto.

Tomando esta encuesta es voluntaria. Sus respuestas son confidenciales. Su nombre no aparecerá en ningún material relacionado con sus respuestas. Usted puede dejar de tomar la encuesta en cualquier momento. Tomará unos 15 minutos para completar la encuesta. Una copia en español de la encuesta se incluye también.

Por favor completar esta encuesta por **April 1st, 2015**. Ponlo en el sobre franqueado con su dirección y colocarla en el correo. Como un agradecimiento especial para hacer esto, usted recibirá 2 horas de trabajo voluntario a su tratamiento dental. Una vez que se devuelve su encuesta, un certificado para estas 2 horas será enviada por correo.

Por favor, póngase en contacto con Lorene Kline al 586-382-1701 (lorkline@umich.edu) o Audrey Taylor al 517-272-5053 (ataylor@carefreemedical.org) si tiene alguna pregunta.

Thank you,

Lorene Kline, RDH, BSDH
Master of Science in Dental Hygiene Program
University of Michigan School of Dentistry
1011 N. University, Room 3066
Ann Arbor, MI 48109-1098

Audrey Taylor, RDH, BSDH
Dental Clinic Administrator
Care Free Dental
5135 S. Pennsylvania Ave
Lansing, MI 48911-4002

APPENDIX D

UNIVERSITY OF MICHIGAN – SCHOOL OF DENTISTRY & CARE FREE DENTAL

Pay It Forward Program Patient Survey

Numero de Identificacion: _____

Muchas gracias por llenar este cuestionario. Queremos asegurarles que todas sus respuestas son estrictamente confidenciales. Su nombre no aparecerá en ningún material relacionado con sus respuestas.

1. Es usted hombre ❑ o mujer ❑ ?

2. Cual es su edad? Yo tengo _____ años de edad.

3. Cuántos años de escolaridad ha tenido usted a partir de primer grado? _____

4. Actualmente soy?

Trabajando tiempo completo ❑ Trabajando medio tiempo ❑
Sin trabajo ❑ Ama de Casa ❑ Otros ❑

En caso de "otros," por favor explique_____

_____

6. Donde se encuentra usted en el programa de Pay It Forward? (Escoja una option)

Sólo registrado para el programa ❑

Haciendo primeras horas de voluntariado ❑

Completado cita con el dentista inicial ❑

Haciendo segunda ronda de horas de trabajo voluntario ❑

El tratamiento dental está terminado hasta la mitad ❑

El tratamiento dental terminó ❑

Otros ❑

En caso de "otros," por favor explique_____

Las siguientes preguntas son acerca de sus dientes y la salud dental:

D1. Cómo describiría la salud de sus dientes y encías antes de empezar el Programa de Pay It Forward?

❑1 ❑2 ❑3 ❑4 ❑5

pobre buena adecuada muy buena excelente

D2. Cómo describiría la salud de sus dientes y encías en este momento?

❑1 ❑2 ❑3 ❑4 ❑5

pobre buena adecuada muy buena excelente

D3. Qué tan importante era su salud dental de usted antes de empezar el Pay It Forward Program?

❑1 ❑2 ❑3 ❑4 ❑5

No era nada importante Muy Importante

D4. Qué tan importante es su salud dental para usted en este momento?

❑1 ❑2 ❑3 ❑4 ❑5

No era nada importante Muy Importante

D5. Tiene usted una dentadura parcial o complete? Si es así, compruebe cuál es:

Prótesis parcial (reemplaza algunos dientes) ❑

Prótesis completa (reemplaza todos los dientes superiores o inferiors) ❑

D6. Con qué frecuencia se cepilla los dientes?

❑1 ❑2 ❑3 ❑4 ❑5

nunca rara vez casi todos los días todos los dias mas de una vez al día

D7. Con qué frecuencia usa el hilo dental en sus dientes?

❑1 ❑2 ❑3 ❑4 ❑5

nunca rara vez casi todos los días todos los dias mas de una vez al día

D8. Cuándo fue tu última visita al dentista antes de inscribirse en el programa Pay It Forward?

❑1	❑2	❑3	❑4	❑5
nunca	más de 5 años	3-5 años	1-2 años	menos de 1 año

D9. Que fue lo que se hizo en su última visita al dentista antes de inscribirse en el programa?

Limpieza❑ **Los rayos X ❑** **Empastes❑**

Extracción de dientes ❑ **Prótesis parcial (reemplaza algunos dientes) ❑**

Prótesis completa (reemplaza todos los dientes superiores o inferiors) ❑ **Otros ❑**

Si es "otros," Lista el tratamiento_____

Las siguientes preguntas son acerca del Programa Pay It Forward:

P1. Qué tratamiento dental pensaste que necesitaba cuando se enteró del programa?

Limpieza ❑ **rayos X ❑** **Empastes ❑**

Extracción de dientes ❑ **Otros ❑**

Si es "otros," Lista el tratamiento:_____

P2. Usted tiene o ha tenido dolor en la boca (dolor de muelas, encías dolor, etc) cuando se enteró de la programa?

Si ❑ **No ❑**

P3. En caso de Si, cuánto dolor tuvo?

❑1	❑2	❑3	❑4	❑5
sin dolor	muy poco dolor	algun dolor	mucho dolor	dolor terrible

P4. Hasta ahora, ¿dónde has hecho tu horas de trabajo voluntario del programa Pay It Forward?_____

P5. Cuántas horas de voluntario has hecho hasta ahora? _____horas

P6. Alguna vez ha sido voluntario en cualquier otro lugar antes de inscribirse en este programa?
Si ❑ **No ❑**

P7. Qué tipo de tratamiento dental ha tenido usted como parte del Programa Pay It Forward?

Por favor marque todo lo que usted ha tenido:

Clase de salud oral ❑ Limpieza❑ Rayos x ❑ Empastes ❑

Extracción de dientes ❑ Otros ❑

Si es "otros," Lista el tratamiento_____

Las siguientes preguntas son acerca de su salud dental y cómo afecta su vida.

P8. Por favor, díganos, ¿cuánto está usted de acuerdo / desacuerdo con las siguientes declaraciones.

	muy de acuerdo	en desacuerdo	neutral	de acuerdo	muy en desacuerdo
Mis dientes y encías limitan los tipos o cantidades de comida que como.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías causan malestar.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías causan mucha preocupación e inquietude.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías me mantienen de socialización/salir.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías me incomodan cuando como en frente de otras personas.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías me incomodan cuando hablo en frente de otras personas.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías me ponen nervioso.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías me hacen preocuparme de la manera que yo me veo.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías me impiden disfrutar la vida.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías interfieren con mis actividades diarias.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías interfieren con mi relación íntima.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías tienen un mal efecto en el sabor de los alimentos.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías reducir mi felicidad en la vida.	❑1	❑2	❑3	❑4	❑5
Mis dientes y encías afectan mi vida en todos sus aspectos.	❑1	❑2	❑3	❑4	❑5

<u>Las últimas preguntas son acerca de cómo le gusta el programa Pay It Forward y qué cambios se cree que puede hacerse:</u>

P9. Cuánto está de acuerdo / de acuerdo con las siguientes afirmaciones?

	muy de acuerdo	en desacuerdo	neutral	de acuerdo	muy en desacuerdo
Me gusta ser voluntario para conseguir mi atención dental.	❑1	❑2	❑3	❑4	❑5
Ser voluntariado no fue difícil.	❑1	❑2	❑3	❑4	❑5
Ser voluntariado me impide trabajar y que me paguen	❑1	❑2	❑3	❑4	❑5
Ser Voluntario quita tiempo de mi familia.	❑1	❑2	❑3	❑4	❑5
Las clases de educación para la salud son interesantes.	❑1	❑2	❑3	❑4	❑5
La clase de educación para la salud era útil.	❑1	❑2	❑3	❑4	❑5
El dentista y el personal me tratan bien	❑1	❑2	❑3	❑4	❑5

	muy de acuerdo	en desacuerdo	neutral	de acuerdo	muy en desacuerdo
El dentista y el personal proporcionan una buena atención.	❑1	❑2	❑3	❑4	❑5
El dentista y el personal me tratan con respeto.	❑1	❑2	❑3	❑4	❑5
Tuve que esperar demasiado tiempo para empezar mi tratamiento dental en el programa.	❑1	❑2	❑3	❑4	❑5
Quiero quedarme en el programa.	❑1	❑2	❑3	❑4	❑5
El Program Pay It Forward me ayudo mucho.	❑1	❑2	❑3	❑4	❑5

Me gusto el Program Pay It Forward Program.	❑1	❑2	❑3	❑4	❑5
Yo recomendaría el programa a miembros de la familia.	❑1	❑2	❑3	❑4	❑5
Yo recomendaría el programa a los amigos.	❑1	❑2	❑3	❑4	❑5

P10. Por favor, díganos lo que te gusta acerca del Programa Pay It Forward.

P11. Por favor, díganos sobre cualquier cosa que no le gusta acerca del Programa Pay It Forward?

P12. Por favor, díganos lo que podría cambiar en el programa para que sea mejor.

Muchas gracias por contestar estas preguntas. Si usted tiene alguna pregunta acerca de este cuestionario, por favor póngase en contacto con Lorene Kline en el número de teléfono (586) 382-1701 o al correo electrónico lorkline@umich.edu.

APPENDIX E

Dentist Recruitment Cover Letter

Dear Pay It Forward volunteer dentist,

I am a dental hygienist obtaining a Master of Science in Dental Hygiene degree through the University of Michigan (U-M). In partnership with Care Free Dental, I am conducting a study to identify both the dentist and patient thoughts about the Pay it Forward Dental Program. For the dentists, I am assessing your perceptions of your volunteering experience and overall views of the Pay It Forward Program.

You have been selected to be a participant in this study since you are either a past or present volunteer dentist in the Pay It Forward Dental Program. The data collected through this survey will provide valuable information to Care Free Dental about the program and potentially to other communities wishing to establish a similar program. Participation in this study is voluntary and responses are confidential. If you agree to take part in this survey, you will have the option to stop answering at any time. The survey will take approximately 10 minutes of your time. The information you provide will be stored in a secure database for future analysis. There are no anticipated risks to participation.

My U-M thesis chairperson for this project is Anne Gwozdek, RDH, BA, MA. This study has been submitted to the U-M Institutional Review Board and has been approved as "exempt." Please contact Lorene Kline (lorkline@umich.edu) or Audrey Taylor (ataylor@carefreemedical.org) if you have any questions.

Please complete the survey and return it in the self-addressed stamped envelope by **April 1st, 2015.** Thank you in advance for your participation.

Lorene Kline, RDH, BSDH
Master of Science in Dental Hygiene Program
University of Michigan School of Dentistry
1011 N. University, Room 3066
Ann Arbor, MI 48109-1098

Audrey Taylor, RDH, BSDH
Dental Clinic Administrator
Care Free Dental
5135 S. Pennsylvania Ave
Lansing, MI 48911-4002

APPENDIX F

UNIVERSITY OF MICHIGAN – SCHOOL OF DENTISTRY & CARE FREE DENTAL
Pay It Forward Program Dentist Survey

ID Number: _____

Thank you for participating in this study and sharing your experiences about the Pay It Forward Program. Let us assure you that your responses are completely confidential.

The first questions are about your background:

1. **Are you: male ❑ or female ❑ ?**

2. **What is your race/ethnicity?_____**

3. **How old are you? _____**

4. **How long have you practiced dentistry?_____years**

5. **Did you receive any graduate/specialty training? Yes ❑ No ❑**

   If yes, what type of specialty training did you receive? _____

6. **Which of the following describes your practice / employment situation?**

   Solo practice ❑ Partnership ❑ Associateship ❑
   Group practice ❑ Other (please, specify): _____

7. **I treat patients in my private practice that are covered by (select all that apply) Medicaid ❑% of practice_____**

   Private Insurance (i.e. Delta, BCBS, etc) ❑ % of practice _____

   Pay out of pocket ❑% of practice _____

8. **How many days per week do you practice?**

9. **On average, how many patients do you personally treat in your practice per week?**

_____

The following questions are related to your involvement with the Pay It Forward Program:

P1. How long have you been participating in the Pay It Forward Program?
_____months.

P2. Have you ever volunteered your dental services before you joined the Pay It Forward Program?
Yes ❑ No ❑

If yes, list other volunteer activities:
_____

P3. Overall, how many pro bono cases did you take on in 2014 other than Pay It Forward patients? _____

P4. How many Pay It Forward patients have you treated so far? _____

P5. How did you hear about the Pay It Forward Program? I found out about it: Through dental society ❑ From radio ❑
From TV ❑ Other ❑
Other, please explain:
_____

_____

P6. Why did you decide to volunteer in the Pay It Forward Program? Please explain:

_____

P7. **On average, how would you describe the oral health of the last Pay It Forward patient for whom you provided an initial dental exam?**

❑1	❑2	❑3	❑4	❑5
poor	fair	good	very good	excellent

P8. **Which dental treatments have you provided to all of your Pay It Forward patients so far? Please check all that apply:**

Prophylaxis/Perio Therapy ❑ X-rays ❑ Fillings ❑ Extractions ❑
Other ❑

Please list "other" treatment: _____

The final questions are about your volunteering in the Pay It Forward program and any suggestions you might have:

P9. **How much do you disagree / agree with the following statements?**

	strongly disagree		neutral		strongly agree
I like the Pay It Forward Program.	❑1	❑2	❑3	❑4	❑5
The Pay It Forward Program is an innovative way of addressing access to care problems.	❑1	❑2	❑3	❑4	❑5
Volunteering for this program is rewarding.	❑1	❑2	❑3	❑4	❑5
I like to give back to my community.	❑1	❑2	❑3	❑4	❑5
The patient(s) in the program appreciate my help.	❑1	❑2	❑3	❑4	❑5
The patient(s) are on time.	❑1	❑2	❑3	❑4	❑5
I would recommend the program to my colleagues.	❑1	❑2	❑3	❑4	❑5
My staff members find value in the program.	❑1	❑2	❑3	❑4	❑5
My staff members like the program.	❑1	❑2	❑3	❑4	❑5
I will continue to volunteer with the program.	❑1	❑2	❑3	❑4	❑5
I would recommend participation in this program to other dentists.	❑1	❑2	❑3	❑4	❑5

P10. Please tell us what you like about the Pay It Forward Program.

P11. Please tell us about any concerns you have with the Pay It Forward Program.

P12. Please provide any suggestions you have for improving the program in the future.

Thank you very much for answering these questions. If you have any question concerning this questionnaire, please contact Lorene Kline at (586) 382-1701 or at email lorkline@umich.edu.

APPENDIX G

Notification of U-M IRB Approval

To: Lorene Kline

From:

Thad Polk

Cc:

Audrey Taylor

Anne Gwozdek

Katherine Yee

Lorene Kline

Michael Manz

Marita Inglehart

Subject: Notice of Exemption for [HUM00094334]

SUBMISSION INFORMATION:
Title: Pay it Forward: Assessing patients' and dentists' responses to a new program
Full Study Title (if applicable):
Study eResearch ID: HUM00094334
Date of this Notification from IRB: 11/25/2014
Date of IRB Exempt Determination: 11/25/2014
UM Federalwide Assurance: FWA00004969 (For the current FWA expiration date, please visit the UM HRPP Webpage)
OHRP IRB Registration Number(s): IRB00000246

IRB EXEMPTION STATUS:
The IRB HSBS has reviewed the study referenced above and determined that, as currently described, it is exempt from ongoing IRB review, per the following federal exemption category:

EXEMPTION #2 of the 45 CFR 46.101.(b):
Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Note that the study is considered exempt as long as any changes to the use of human subjects (including their data) remain within the scope of the exemption category above. Any proposed changes that may exceed the scope of this category, or the approval conditions of any other non-IRB reviewing committees, must be submitted as an amendment through eResearch.

Although an exemption determination eliminates the need for ongoing IRB review and approval, you still have an obligation to understand and abide by generally accepted principles of responsible and ethical conduct of research. Examples of these principles can be found in the Belmont Report as well as in guidance from professional societies and scientific organizations.

SUBMITTING AMENDMENTS VIA eRESEARCH:
You can access the online forms for amendments in the eResearch workspace for this exempt study, referenced above.

ACCESSING EXEMPT STUDIES IN eRESEARCH:
Click the "Exempt and Not Regulated" tab in your eResearch home workspace to access this exempt study.

Thad Polk
Chair, IRB HSBS

APPENDIX H

Collaborators

Lorene Kline <lorkline@umich.edu> Feb 24

to Audrey, carriaga, Anne

Hello Audrey and Christina,

I am currently working on developing my research proposal for my thesis committee to review. I wanted to know if it is okay that I list both of you in my research proposal as Consultants/Collaborators? If so, would you please let me know that this is okay? Also Christina, could you please provide me with your title at Care Free? Thank you both so very much!

Sincerely,

Lorene Kline, BSDH

Audrey Taylor <ATaylor@carefreemedical.org> Feb 24

to me

Hello Lorene,

That is completely fine with me. My title has changed, the updated one is below if you need it.

Audrey D. Taylor RDH, BSDH
Director of Ancillary Services
Care Free Medical & Dental
5135 S. Pennsylvania Ave.
Lansing, MI 48911
517-272-5053

Christina Arriaga <CArriaga@carefreemedical.org> Feb 27

to me

Sorry to get back to you so late. Yes that is fine if you include me in your thesis and I am the Dental Clinic

Coordinator.

BIBLIOGRAPHY

1. American Dental Hygienists' Association. Access to care position paper. Chicago (IL): American Dental Hygienists' Association; 2001. 9 p.

2. Dolgin J. Who's smiling now? Disparities in American dental health. Fordham Urban Law J. 2013;40:1421–46.

3. Davis K, Ballreich J. Equitable access to care--how the United States ranks internationally. N Engl J Med. 2014;37:1567–70.

4. Wehmeyer MMH, Corwin CL, Guthmiller JM, Lee JY. The impact of oral health literacy on periodontal health status. J Public Health Dent. 2014;74:80–7.

5. US Department of Health and Human Services. Oral health in America: a report of the Surgeon General-executive summary. Rockville (MD): US Department of Health and Human Services, National Institute of Dental and Craniofacial Research; 2000. 18 p.

6. Perry JS, Shuman D, Green M, McCombs G. Access to oral health care in Virginia. J Dent Hyg. 2005;79:21.

7. Wall T, Nasseh K, Vujicic M. Most important barriers to dental care are financial, not supply related. Chicago (IL): American Dental Association Health Policy Institute; 2014. 9 p.

8. Nasseh K, Vujicic M. Dental care utilization rate highest ever among children, continues to decline among working-age adults. Chicago (IL): American Dental Association's Health Policy Institute; 2013.10 p

9. Steele J, Shen J, Tsakos G, Fuller E, Morris S, Watt R, et al. The interplay between socioeconomic inequalities and clinical oral health. J Dent Res. 2015;94:19–26.

10. Stolberg RL, Brickle CM, Darby MM. Development and status of the advanced dental hygiene practitioner. J Dent Hyg. 2011;85:83-91.

11. Sischo L, Broder HL. Oral health related quality of life: what, why, how and future implications. J Dent Res. 2011;90:1264–70.

12. Hyde S, Satariano WA, Weintraub JA. Welfare dental intervention improves employment and quality of life. J Dent Res. 2006;85:79–84.

13. Meurman JH, Sanz M, Janket SJ. Oral health, atherosclerosis, and cardiovascular disease. Crit Rev Oral Bio Med. 2004;15:403-13.

14. AlJehani YA. Risk factors of periodontal disease: review of the literature. Int J Dent. 2014;May:e1-9.

15. American Academy of Periodontology. Parameter on systemic conditions affected by periodontal diseases. J Periodontol. 2000;71:880–3.

16. Care Free Medical and Dental. [Internet]. Lansing (MI): Care Free Medical and Dental. c2015 [cited 2015 Jul 26]; [about 3 screens]. Available from: http://www.carefreemedical.com/about/history-2/

17. Care Free Medical and Dental, Pay It Forward [Internet]. Care Free Medical and Dental; c2015. About Pay It Forward; [cited 2015 Jan 28]; [about 1 screen] Available from: http://www.carefreemedical.com/about/pay-it-forward/

18. American Dental Education Association. Examining America's dental safety net. Chicago (IL): American Dental Education Association Policy Center; 2015. 17 p.

19. The Henry J. Kaiser Foundation. Dental care health professional shortage areas (HPSA's) [Internet]. Washington (DC): c2015. The Henry J. Kaiser Foundation [cited 2015 Jun 2]; [about 3 screens]. Available from: http://kff.org/other/state-indicator/dental-care-health-professional-shortage-areas-hpsas/

20. Tavares M, Lindefjeld Calabi KA, San Martin L. Systemic diseases and oral health. Dent Clin N Am. 2014;58:797–814.

21. Kuo LC, Polson AM, Kang T. Associations between periodontal diseases and systemic diseases: a review of the inter-relationships and interactions with diabetes, respiratory diseases, cardiovascular diseases and osteoporosis. R Inst Public Health. 2007;122:417–33.

22. Sanz M, Kornman K. Periodontitis and adverse pregnancy outcomes: consensus report of the joint EFP/AAP workshop on periodontitis and systemic diseases. J Periodontol. 2013;84:164–9.

23. US Department of Health and Human Services [Internet]. Washington (DC): US Department of Health and Human Services; c2015. Dental HPSA designation overview; [cited 2015 May 20]; [about 1 screen]. Available from: http://bhpr.hrsa.gov/shortage/hpsas/designationcriteria/dentalhpsaoverview.html

24. US Department of Health and Human Services [Internet]. Washington (DC): US Department of Health and Human Services; c2015. Health professional shortage areas - dental care; [cited 2015 May 20]; [about 1 screen]. Available from: http://datawarehouse.hrsa.gov/tools/mapgallery.aspx#hpsa

25. US Department of Health and Human Services [Internet]. Washington (DC): US Department of Health and Human Services; c2015. Health Resources and Services Administration Data Warehouse. Quick maps - dental care health professional shortage areas (HPSA); [cited 2015 May 20]; [about 1 screen]. Available from: http://datawarehouse.hrsa.gov/Tools/MapToolQuick.aspx?mapName=HPSADC

26. Michigan Oral Health Coalition. Check-up on oral health, a Michigan county profile Lansing (MI): Michigan Oral Health Coalition; 2013. 116 p.

27. National Governors Association. The role of dental hygienists in providing access to oral health care. Washington (DC): National Governors Association; 2014.18p.

28. Naughton DK. Expanding oral care opportunities: direct access care provided by dental hygienists in the United States. J Evid Based Dent Pract. 2014;14S:171–82.

29. Michigan Department of Health and Human Services. [Internet]. Lansing (MI): Michigan Department of Health and Human Services; c2015. 2013 PA161 Annual Report. [cited 2015 Jun 17]; [about 1 screen]. Available from: http://www.michigan.gov/mdch/0,4612,7-132--265001--00.html

30. American Dental Hygienists' Association. [Internet]. Chicago (IL): American Dental Hygienists' Association; c2012. Direct Medicaid reimbursement; [cited 2015 Jun 21]; [about 1 screen]. Available from: http://www.adha.org/resources-docs/7526_Medicaid_map.pdf.

31. Okunseri C, Bajorunaite R, Abena A, Seif K, Iacopino AM, Flores G. Racial/ethnic disparities in the acceptance of Medicaid patients in dental practices. Am Assoc Public Health Dent. 2008;68:149–53.

32. Dharamsi S, Pratt DD, MacEntee MI. How dentists account for social responsibility: economic imperatives and professional obligations. J Dent Educ. 2007;71:1583–92.

33. Walker A, Probst JC, Martin AB, Bellinger JD, Merchant A. Analysis of hospital-based emergency department visits for dental caries in the United States in 2008. J Public Health Dent. 2008;74:188–94.

34. Cadoret CA, Garcia RI. Health disparities and the multicultural imperative. J Evid Based Dent Pract. 2014;14S:160–70.

35. Shi L, Lebrun LA, Tsai J. Access to medical care, dental care, and prescription drugs: the roles of race/ethnicity, health insurance and income. South Med J. 2010;103:509–16.

36. Shelley D, Russell S, Parikh NS, Fahs M. Ethnic disparities in self-reported oral health status and access to care among older adults in NYC. J Urban Health NY Acad Med. 2011;88:651–61.

37. Traylor AH, Schmittdiel JA, Uratsu CM, Mangione CM, Subramanian U. The predictors of patient-physician race and ethnic concordance: a medical facility fixed-effects approach. Health Serv Res. 2010;45:792–804.

38. Smith ML, Dickerson JB, Wendel ML, Ahn SN, Pulczinski JC, Drake KN, et al. The utility of rural and underserved designations in geospatial assessments of distance traveled to healthcare services: implications for public health research and practice. J Environ Public Health. 2013;2013:1-11.

39. Schwendicke F, Dorfer CE, Schlattmann P, Foster P, Thomson WM, Paris S. Socioeconomic inequality and caries: a systematic review and meta-analysis. J Dent Res. 2015;94:10–8.

40. Dao LP, Zwetchkenbaum S, Inglehart MR. General dentists and special needs patients: does dental education matter? J Dent Educ. 2005;69:1107-15.

41. Inglehart MR, Scneider BK, Bauer A, Dharia MM, McDonald NJ. Providing care for underserved patients: endodontic residents', faculty members', and endodontists' educational experiences and professional attitudes and behavior. J Dent Educ. 2014;78:735–44.

42. Brown BR, Inglehart MR. Orthodontists' and orthodontic residents' education in treating underserved patients: effects on professional attitudes and behavior. J Dent Educ. 2009;73:550-62.

43. Garfinkle AJ, Richards PS, Inglehart MR. Providing care for underserved patients: periodontists' and periodontal residents' educational experiences, attitudes, and behaviors. J Periodontol. 2010;81:1604–11.

44. Ornstein KA, DeCherrie L, Gluzman R, Scott ES, Kansal J, Shah T, et al. Significant unmet oral health needs of homebound elderly adults. J Am Geriatr Soc. 2015;63:151–7.

45. El-Solh AA. Association between pneumonia and oral care in nursing home residents. Lung. 2011;189:173–80.

46. Rereddy SK, Jordan DR, Moore CE. Dying to be screened: exploring the unequal burden of head and neck cancer in health provider shortage areas. J Cancer Educ. 2014;10:0755–62.

47. Inglehart MR, Bagramian RA. Oral Health-Related Quality of Life. Chicago (IL): Quintessence; 2002. 224 p.

48. Olmstead JL, Rublee N, Zurkawski E, Kleber L. Public health dental hygiene: an option for improved quality of care and quality of life. J Dent Hyg. 2013;87:299–308.

49. Davis EE, Deinard AS, Maiga EWH. Doctor, my tooth hurts: the costs of incomplete dental care in the emergency room. J Public Health Dent. 2010;70:205–10.

50. Rosaen A, Horowitz J. The cost of dental-related emergency room visits in Michigan. East Lansing (MI): Anderson Economic Group; 2014. 27 p.

51. Michigan Department of Health and Human Services. [Internet]. Lansing (MI): Michigan Department of Health and Human Services. c2015. Demographic profile of Michigan; 2010 [cited 2015 Jun 6]; [about 4 screens]. Available from: www.michigan.gov/documents/mdch/Michigan_State_Oral_Health_Plan_FINAL_317983_7.pdf

52. American Dental Hygienists' Association. Dental hygiene education curricula, program, enrollment and graduate information. Chicago (IL): American Dental Hygienists' Association; 2014. 34 p.

53. Higbea RJ, Palumbo CH, Pearl SA, Byrne MJ, Wise J. Dentists partnership of Michigan's Calhoun County: a care model for uninsured populations. Health Affairs. 2013;9:1646–51.

54. Garber R. (Development and Communications Director, The Community Dental Access Initiative, Battle Creek, MI). Conversation with: Lorene Kline (Master of Science in Dental Hygiene Program, University of Michigan, Ann Arbor, MI). 2015 Jun 25.

55. Agency for Healthcare Research and Quality. [Internet]. Rockville (MD): Program offering free dental care in exchange for community service significantly reduces dental-related emergency department visits by uninsured individuals. 2014 Jun 18 [cited 2015 Feb 21]; [about 9 screens].Available from: https://innovations.ahrq.gov/profiles/program-offering-free-dental-care-exchange-community-service-significantly-reduces-dental

56. Mlive [Internet].Low-income people in Muskegon County offered dental work in exchange for volunteering. c2015 [cited 2015 Jun 6]; [about 2 screens]. Available from: www.mlive.com/news/muskegon/index.ssf/2010/09/low-income_people_in_muskegon.html

57. Tanis, S (Program Coordinator, Muskegon Volunteer for Dental Care, Muskegon, MI). Conversation with: Lorene Kline (Master of Science in Dental Hygiene Program, University of Michigan, Ann Arbor, MI). 2015 Jun 25.

58. Allen D. Volunteering works. Ment Health Pract. 2008;11:6–7.

59. Brownson RC, Fielding JE, Maylahn CM. Evidence-based public health: a fundamental concept for public health practice. Annu Rev Public Health. 2009;30:175–201.

60. Miller JD. Public understanding of, and attitudes toward, scientific research: what we know and what we need to know. Public Underst Sci. 2004;13:273–94.

61. Kumar R. Research methodology, a step-by-step guide for beginners. 3rd ed. Thousand Oaks (CA): Sage Publications; 2011. Chapter 1, Research: a way of thinking; p.1-16.

62. Blessing JD, Forrister JG. Introduction to research and medical literature for health professionals. 3rd ed. Burlington (MA): Jones & Bartlett Learning; 2013. Chapter 10, Survey research; p.137-53.

63. Shih TH, Fan X. Comparing response rates in e-mail and paper surveys: a meta-analysis. Educ Res Rev. 2009;4:26–40.

64. Bakan J, Chen B, Medeiros-Nancarrow C, Hu JC, Kantoff PW, Recklitis CJ. Effects of a gift certificate incentive and specialized delivery on prostate cancer survivors' response rate to a mailed survey: a randomized-controlled trial. J Geriatr Oncol. 2014;5:127–32.

65. Hardigan PC, Succar CT, Fleisher JM. An analysis of response rate and economic costs between mail and web-based surveys among practicing dentists: a randomized trial. J Community Health. 2012;37:383–94.

66. King KM, Khan N, LeBlanc P, Quan H. Examining and establishing translational and conceptual equivalence of survey questionnaires for a multi-ethnic, multi-language study. J Adv Nurs. 2011;67:2267–74.

67. Readability formulas [Internet]. 2015 [cited 2015 Jan 21]; [about 1 screen]. Available from: http://www.readabilityformulas.com/free-readability-formula-assessment.php.

68. Henson B, Inglehart MR, Eisbruch A, Ship J. Preserved salivary output and xerostomia-related quality of life in head and neck cancer patients receiving parotid-sparing radiotherapy. Oral Oncol. 2001;37:84-93.

69. Roy A. Healthcare and the profit motive. [Internet]. Washington (DC): National Affairs, Inc.; c2014 [cited 2016 May 30]; [about 6 screens]. Available from: http://www.nationalaffairs.com/publications/detail/health-care-and-the-profit-motive

70. US Bureau of Labor Statistics. BLS Reports, A profile of the working poor, July 2013. Washington (DC): US Bureau of Labor Statistics; last modified 2016 April 18 [cited 2016 May 30]; [about 2 screens]. 18 p. report 1055. Available from: www.bls.gov/opub/reports/working-poor/archive/a-profile-of-the-working-poor-2013.pdf

71. O'Donnell J, Ungar L. Health care for the poor: communities seek solutions [Internet]. McLean (VA): USAtoday.com 2016 Jan 8 [cited 2016 May 30]; [about 6 screens]; Available from: http://www.usatoday.com/story/news/nation/2015/12/28/up-75-without-medicaid-working-poor-who-cant-job-related-insurance/75657202/

72. Hyjer Dyk P. Complexity of family life among the low-income and working poor. Family Relat. 2004;53:122-6.

73. Brandon E. How retirees spend their time [Internet]. Washington (DC): US News & World Report; c2016. 2013 Jul 8 [cited 2016 May 23]; [about 3 screens]. Available from: http://money/usnews.com/money/retirement/articles/2013/07/08/how-retirees-spend-their-time

74. Goldstene C. The decline of unions precipitated the rise of the underground economy [Internet]. Davis (CA): The people's vanguard of Davis; c2014 [cited 2016 May 23]; [about 2 screens]. Available from: http://www.davisvanguard.org/2015/07/the-rise-of-the-underground-economy/

75. Wallis KG. Volunteerism within dentistry. J Calif Dent Assoc. 2015;43:713-31.

76. Taylor A. (Director of Ancillary Services, Care Free Medical and Dental, Lansing, MI.) Conversation with: Lorene Kline (Master of Science in Dental Hygiene Program, University of Michigan, Ann Arbor, MI) 2016 May 26.

77. MI.gov. Healthy Michigan Plan [Internet]. Lansing (MI): c2016. Healthy Michigan Plan, who is covered? [cited 2016 Jun 6]; [about 2 screens]. Available from: http://www.michigan.gov/healthymiplan/0,5668,7-326-67874---,00.html.

78. Volunteers of America [Internet]. Alexandria (VA): c2016. Our mission [cited 2016 Jun 6]; [about 2 screens]. Available from: https://www.voa.org/our-mission

79. Travis B. (Executive Director, Calhoun Couty Dentists' Partnership, Battle Creek, MI) Conversation with: Lorene Kline (Master of Science in Dental Hygiene Program, University of Michigan, Ann Arbor, MI) 2016 June 1.

80. Tanis S (Program Coordinator, Muskegon Volunteer for Dental Care, Muskegon, MI) Conversation with: Lorene Kline (Master of Science in Dental Hygiene Program, University of Michigan, Ann Arbor, MI) 2016 June 3.