Analysis of The Ohio State University College of Optometry
Clinical Referral Process

THESIS

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Abstract

Purpose: To analyze the effectiveness of the clinical referral process at The Ohio State University College of Optometry (OSUCO). This study should foster better understanding of factors that affect patient attendance at referral appointments as well as to identify clinical practices that will promote improved health care delivery.

Method: Fifty records of patients referred from the College of Optometry to a specialist were identified and the data collected. In addition one hundred records were selected for the subsequent study. Subsequent study subjects were interviewed regarding patient’s perceptions of the effectiveness of the referral process. Calculations were performed to determine the probability of associations between each referral process and factors that may have had an effect on patient’s attendance at their referral appointment.

Results: Pilot study results indicated it was feasible to obtain referral data from the OSUCO electronic health records and that further study could be considered. In addition the Pilot study did not reveal significant associations between referral processes and attendance at the referral appointment. Subsequent study results found that scheduling of the referral appointment increased with “Letter and Phone Call” referral communications. Caucasian patients were more likely to be referred using “Letter Only” referral communications when compared to other ethnicities. The Binocular Vision Clinic and Low Vision clinic were also more likely to use” Letter Only” referral communications.
when referring patients. Subsequent study results also found that patients who were referred with “Letter and Phone Call” referral communications had a statistically significant association with positive attendance at the referral appointment.

**Conclusions:** The “Letter and Phone Call” referral communication method resulted in an increase in the patient attendance when compared to the “Letter Only” referral communication method. This difference, however, was not clinically meaningful because the 21.75% difference between the two methods did not meet the pre-set 50% threshold for a clinically meaningful difference. These results suggest that current OSUCO clinical practices are effective in ushering patients towards successful attendance of their referral appointments. It is quite possible that there are unstudied factors that may also affect successful attendance. Future investigations, can elaborate the hierarchy of those factors.
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Chapter 1: Introduction

Eye diseases such as diabetic retinopathy, glaucoma, cataract, and age-related macular degeneration (AMD) cause blindness and impaired vision in millions of Americans and require the expertise of multiple coordinating healthcare providers. Approximately 18.2 million people in the United States of America suffer with diabetes and one in four American adults have high blood pressure (French, Mundt, Fleming, & Zavala, 2005). Care of these patients with chronic conditions such as diabetes requires a multidisciplinary team to fully assess systemic and ocular health. This team, often assembled by the patient’s primary care physician, may include the eye care practitioner, nurse, endocrinologist, dietitian, and podiatrist.

In the United States, recent studies indicate that the prevalence and economic impact of vision impairment due to chronic disease has increased significantly. It is estimated that eye disorders have been identified as the fifth most prevalent health condition among those aged 65 years and older, which represents about 23% of the United States population. Eye disorders are the seventh most prevalent health condition in all other age groups (Prevalence of Adult Vision Impairment, 2013). If vision impairment is allowed to progress in severity, significant cost burdens often result for the patient and for insurance payers. The estimated cost of treating blindness and low vision is $6,680 per person, per year (Prevalence of Adult Vision Impairment, 2013). Costs for
treating vision impairment in the U.S. approaches $139 billion per year. This amount includes the cost of all diagnostic vision care visits, which is a total of $48.8 billion per year (Economic Burden of Vision Loss in the United States, 2013).

As the gatekeepers in the vision care arena, optometrists are well positioned to diagnose chronic conditions at early stages and to coordinate appropriate medical interventions with the rest of the medical team. According to the results of the Salisbury Eye Evaluation Study, half of those individuals with vision impairment have conditions that can be either treated or prevented (Munoz et al., 2000). Even when there is access to visual health care services, Americans often do not fully utilize such services. Eye Care utilization rates ranges from 33.7% to 58.3%, in populations with visual levels ranging from no visual impairment to severe impairment (Lee et al., 2009).

Several factors influence utilization of eye care. Individuals who have no reported visual impairment often do not seek care. Patients who lack health insurance often face financial obstacles to vision care. Patients with low literacy, low educational levels and non-English speakers all face significant barriers to vision care utilization (Lee et al., 2009). Due to the various barriers to eye care, clinicians must initiate every necessary step to ensure high quality patient care.

In the clinical management of patients, clear and concise communication among all members of the health care team is essential. Communication between medical personnel accounts for a major portion of the flow of information within the health care system. Growing evidence indicates that errors in communication give rise to substantial clinical morbidity and mortality (Coiera, 2000). A retrospective review of Australian
hospitals revealed that in 14,000 in-hospital deaths, communication errors were found to be a significant cause. Specifically communication errors were more likely to cause an increase in deaths rather than inadequate clinical skill (Coiera, 2000). In a study of primary care physicians, adverse clinical events were associated with communication inaccuracies (Coiera, 2000).

The main objective of communication between healthcare providers is to transmit essential information that permits the ideal treatment of the patient (Leonard, Babbs, & Creed, 1990). Accurate gathering and sharing of vital patient information characterizes effective inter-professional communication. Essential referral information includes pertinent patient and family history, clinical findings and tentative diagnosis (es). It is also helpful to share information such as delineating what patient education has been given, strategic planning of who will be responsible for the ongoing management of the patient, and encouragement offered towards keeping the door open for further communication (P. T. Williams & Peet, 1994).

The management of vision disorders often entails treatment of ocular disease resulting from systemic health conditions. Therefore, clear communication between optometrists and specialists is vital to the effective treatment of patients with visual disorders. There is evidence, however, that clinicians are often dissatisfied with the referral aspect of their practice. Frequently referring doctors complain about not receiving letters from consultants and specialists often report that referring physicians rarely supply pertinent patient information (P. T. Williams & Peet, 1994). Review of the consultation process between referring and consulting physicians reveals interest from both parties.
towards improved communications (P. T. Williams & Peet, 1994). Medical management faces significant loss to quality of care with ineffective communication (P. T. Williams & Peet, 1994).

The referral process has typically included letters as the sole method of communicating information between general practitioners and specialists (Newton, Eccles, & Hutchinson, 1992). Letters were adopted because they can be used as flexible instruments to convey communications that can be straightforward or complex. Referral letters are also helpful as effective tools to educate both the general practitioner and specialist. Proper patient care often hinges on the information that is transmitted between providers, so it is important that this process work as effectively as possible (Newton et al., 1992).

Referral communications can vary between providers but there is a standardized procedure that is recognized generally between healthcare providers. Researchers described five steps in the consultation-referral process (T. F. Williams, White, Fleming, & Greenberg, 1961):

(1) The referring physician defines the need and purpose of the referral. This clinician also educates the patient about the nature of the referral.

(2) The referring physician communicates these needs to the consultant

(3) The consulting physician addresses the purpose and problem as requested

(4) The consulting physician communicates his/her findings and recommendations to the referring physician
(5) The referring physician, consulting physician, and patient develop a clear understanding of the responsibilities for continuing care. Although this referral procedure is considered to be standard of care, it is not consistently applied between providers. Incomplete follow through of any of the above steps can result in poor health outcomes for the patient. If a provider omits a step in the referral process, patients can be lost to follow up.

An in depth analysis of the effect of general referral procedures within the optometric profession is currently not available. Further research in this area will create better understanding of influential factors in the referral process.

The purpose of this project is to analyze the effectiveness of the clinical referral process at The Ohio State University College of Optometry. Electronic health records of patients referred from the College of Optometry to a consulting specialist are identified and the resulting referral data collected. Effectiveness of the referral process is assessed by the outcome measure of positive patient attendance (did the patient go) at the appointment with the consulting practitioner. The goal of this study is to understand factors that promote or deter patients to or from attending the referral appointment. The mission will be to isolate practices that the referring provider can initiate, that will promote positive outcomes and improved health care delivery.
Chapter 2: Vision Impairment & American Population

2.1 Introduction & Vision Impairment Definition

Optometric referrals are initiated when ocular and systemic conditions require treatment or consultation from a specialist. These conditions can vary but many lead to debilitating visual impairment.

The US population is aging at a significant rate. In 2012, 43.1 million Americans were 65 years or older, and that number is expected to increase to 79.7 million in 2040 (Profile of Older Americans, 2013). As individual’s age increases, so does the prevalence of visual impairment and blindness.

In this study the definition of vision impairment and blindness will be referenced from the International Statistical Classification of Disease: “Mild vision impairment, with best correction, is defined as visual acuity of 20/70 or less in the better eye and visual acuity of 20/200 or less in the worse eye. Moderate visual impairment is defined as visual acuity 20/200 or less in the better eye and visual acuity of 20/400 or less in the worse eye, Severe visual impairment is defined as 20/400 or less in the better eye and visual acuity of 20/1200 or less in the worse eye” (Dandona & Dandona, 2006). “Blindness is visual decrease, that at its start, is visual acuity of 20/400 or worse in the better eye and Count Fingers in the worse eye. Blindness can progress to count fingers in the better eye and light perception in the worse eye or no light perception in either eye” (Dandona & Dandona, 2006).
2.2: Prevalent Conditions that can lead to Vision Impairment

Examples of prevalent ocular and systemic conditions that can lead to severe vision impairment include diabetic retinopathy, cataracts, age related macular degeneration, and glaucoma. There are several other conditions that can lead to vision impairment, not all are listed here. With appropriate treatment, the progression and severity of each of these conditions can be significantly slowed or halted. Each of these conditions is a key player in causing vision impairment and blindness within the United States.

Diabetes Mellitus & Diabetic Retinopathy

The systemic condition Diabetes Mellitus is a disorder of carbohydrate metabolism characterized by high levels of blood glucose resulting from insufficient insulin secretion, insulin action, or both (O'Connor et al., 2012). The human body reduces carbohydrates into glucose to be utilized by the cell, in order for this to happen insulin must be present. During digestion, the pancreas automatically produces an appropriate amount of insulin to move glucose from blood into our cells. In people with diabetes, however, the pancreas either produces little or no insulin, or the cells do not respond appropriately to the insulin that is produced (O'Connor et al., 2012). Glucose builds up in the blood, overflows into the urine, and passes out of the body. Thus the body loses its main source of fuel even though blood contains large amounts of glucose (Szablewski, 2014).

Over time this excess glucose circulating through the body in the blood stream can lead to a number of long-term complications including kidney failure, blindness (through
diabetic retinopathy), amputations, and heart problems. Approximately 18.2 million Americans have the disease and almost one third (or approximately 5.2 million) are unaware that they have it (Mammas et al., 2014).

Diabetic retinopathy is a significant complication of diabetes that damages the blood vessels that supply blood to the retina. The vessels swell and leak liquid into the retina, resulting in blurred vision and sometimes blindness (Costacou, Secrest, Ferrell, & Orchard, 2014). Referral for treatment of retinopathy at its early stages can prevent significant visual loss and reduce compromise of life activities.

Cataracts

The natural crystalline lens is a key refractive element of the eye, which with the cornea focuses images of the visual world onto the retina. The lens achieves this by its biconvex shape, high refractive index transparency, and the act of accommodation (Michael & Bron, 2011). This transparent lens undergoes ageing changes that can lead to a significant decrease in the clarity of lens. A continuous series of biochemical and biophysical changes, starting pre-natally, lead to increased light scattering, coloration, stiffness of the lens, and ultimately a cataract (Michael & Bron, 2011).

Cataract is a clinical syndrome involving the loss of transparency of the crystalline lens and this leads to reduced vision (Yam & Kwok, 2014). This loss of lens transparency has been associated to several causes such as UV exposure, nutritional deficits, smoking, medication usage, alcohol use, and vascular conditions such as diabetes and hypertension. One age related decrease in transparency of the lens called nuclear cataract, is a lens
opacity confined to the true nucleus of the lens whose shape is determined by the concentric arrangement of the fibers that compose it (Michael & Bron, 2011). Nuclear cataract forms from oxidative changes within the lens that results in increased light scatter, and increases in coloration of the lens nucleus. This is facilitated by a lack of nuclear GSH (glutathione) within the nucleus of the lens. The biomicroscopic features include an increase in light- scattering, to produce a grey-white opacity, and/or a color change ranging from yellow-brown in its early stages to deep, blackish-brown of advanced nuclear cataract (Michael & Bron, 2011)). In the nuclear core, there are membrane breaks, loss of membrane segments and exposure of fiber contents of extracellular space, which is enlarged in many regions and contain dense deposits of protein-like material(Michael & Bron, 2011).

The resulting fluctuations in density and refractive index are believed to produce significant light scattering. This light scattering can occur through various cataract formations in differing aspects of the lens. Its effect on vision can lead to a decrease in clarity, contrast sensitivity and an increase in glare and halos.

These areas of visual compromise can significantly affect activities of daily living for many individuals and can lead to much of the world's blindness and visual impairment. A practitioner’s referral for the removal of cataract through surgical procedures, by an ophthalmology specialist is currently the only mode of treatment.
Age Related Macular Degeneration

Age related macular degeneration (AMD) is an ocular condition which is significant cause of blindness in the United States and industrialized nations. An estimated 10 million Americans are afflicted with AMD, which is comparable to 12 million living with cancer (Ambati & Fowler, 2012).

In studying AMD, the retinal pigment epithelium (RPE) is at the starting place of AMD pathophysiology (Ambati & Fowler, 2012). Hypoxia, decreased oxygen content and inflammatory factors can lead to increased loss of RPE and leakage and other inflammatory responses in the retina. There are two types of AMD, the “dry” and “wet” forms. Dry AMD is a chronic disease that usually causes some degree of visual impairment and sometimes progresses to severe blindness. In contrast, wet AMD affects only 10-15% of AMD patients, emerges abruptly and rapidly progresses to blindness if left untreated (Ambati & Fowler, 2012).

In early stages of dry AMD, which is asymptomatic, insoluble extracellular collections called drusen accumulate in the retina. The late stage of dry AMD, which is also known as geographic atrophy (GA), is characterized by scattered or confluent areas of degeneration of the retinal pigment epithelium (RPE) cells and the overlying light sensing retinal photoreceptors, which rely on the RPE for nutritional support (Ambati & Fowler, 2012).

The other late stage form of AMD, the wet form, is typified by choroidal neovascularization (CNV) wherein newly immature blood vessels grow towards the outer retina from the underlying choroid. The immature blood vessels leak fluid below or
within the retina. This leakage into the retinal tissue layers leads to significant vision impairment and blindness for patients. Early detection and referral of patients with this condition to the appropriate specialist is a priority of primary eye care providers.

Glaucoma

Glaucoma is a condition that affects more than 70 million people worldwide with approximately 10% being bilaterally blind, making it the leading cause of blindness worldwide (Weinreb, Aung, & Medeiros, 2014). Glaucoma is a group of optic neuropathies characterized by progressive degeneration of retinal ganglion cells. These retinal cells are central nervous system neurons that have their cells bodies in the inner retina and axons in the optic nerve. Degeneration of these nerves results in cupping, a characteristic appearance of loss of these neuronal tissues in the optic disc, and it is characteristic of visual loss (Weinreb et al., 2014).

Pathogenesis of glaucoma is not fully defined though there is a strong correlation of high intra-ocular pressure and retinal ganglion cell death. The balance between secretion of aqueous humor by the ciliary body and its drainage between two independent sources, the trabecular meshwork and uveoscleral pathway, determines intra-ocular pressure (Weinreb et al., 2014). Intra-ocular pressure can cause mechanical stress and strain on the posterior structures of the eye, notably the lamina cribosa and the adjacent tissues (Weinreb et al., 2014). Disrupted axonal transport can lead to metabolic stress that the ganglion cell layers undergo and cause mitochondrial dysfunction in retinal ganglion cell layer and astrocytes. Due to this dysfunction high levels of energy demand
may be difficult to meet during periods of intraocular pressure induced metabolic stress. As energy demand continues to become difficult to meet retinal ganglion cell function decreases and leads to vision impairment and blindness.

Detection of glaucoma at an early stage can prevent the progression of irreversible blindness. Eye care providers can be key to halting this condition by diagnosing it early, implementing treatment and/or referring patients to the appropriate specialist providers.

2.3: Epidemiology of Vision Impairment & Blindness

Global

Estimates of the prevalence of vision impairment and blindness indicate that globally there are 314 million people who are visually impaired worldwide and 45 million of these individuals are legally blind (Pascolini & Mariotti, 2012). It has been determined that over 145 million of these visually impaired cases are a result of uncorrected refractive error. Most of these individuals could have their sight restored with the provision of prescription glasses. Within the population of blind individuals, 90% of these people live in low-income countries and most of their ocular conditions are preventable or treatable. Globally some of the leading causes of international blindness and vision impairment are the following: Cataracts (42%), Trachoma (15%), Glaucoma (13%) and uncorrected Refractive Error (33%) (Pascolini & Mariotti, 2012).
United States

Global vision impairment estimates are far greater than those in the United States. Nevertheless, when systemic and ocular conditions are not addressed in a timely manner, many American can face the same visual disabilities. Blindness and low vision are widely recognized as significant causes of impairment and disability among Americans (Eye diseases Prevalence Research Group, 2004). It is estimated that blindness and low vision affects approximately 1 in every 28 Americans older than 40 years of age (Eye Diseases Prevalence Research Group, 2004). This correlates to a total of 3.3 million Americans aged 40 years and older with this disability. Projections of an increase in prevalence of blindness and low vision in the United States during the next two decades are due to an anticipated increased amount of ocular disease in persons older than 65 years of age causes (Congdon et al., 2004).

Within the United States, visual disability is often due to populations within the US having differing levels of health equity. “Health equity is the opportunity for everyone in the population to attain full health potential and no one is disadvantaged from achieving this potential because of social position or circumstance”(Whitehead, 2012). Systematic and unjust distribution of social, economic, and environmental conditions can lead to disproportionate health disparities. Health disparities lead to differences in the incidence and prevalence of health conditions and health status between groups of people.
There are also several social determinants of health that vary between populations and communities. These social determinants are life-enhancing resources such as food supply housing, economics, transportation, education and health care. The distribution of these commodities across a population effectively determines length and quality of life. These social determinants play a significant part, in the health economics of a community.

Some communities have significant needs but limited resources. Studies suggest that societies that have significant gaps between the richest and poorest of their citizens tend to exhibit similar disparities in the health status of those citizens. The United States can have a larger incidence of healthcare concerns than a country that has a smaller gap between rich and poor. The United States richest population is 8.5 times richer than the poorest of America, and this is only second to Singapore, whose richest rich are 9.7 times richer than the poorest (Pickett & Wilkinson, 2007).

Economic disparities contribute to health disparities. Health disparities, which include vision health inequities, have significant impacts on our nation’s public health, disproportionately affecting populations within society. Individuals with chronic diseases such as diabetes struggle significantly if they cannot afford the medication needed to treat their condition.

Diabetes has become an epidemic that is over taking our nation. The prevalence of diabetic retinopathy increased an alarming 89% from 2000 to 2012. (Prevent Blindness Vision & Eye Health a significant public health challenge).
Ocular conditions prevalent in children tend to increase in American populations that struggle with financial constraints. It is estimated that more than 12.1 million school-age children have some form of vision problem. The growing prevalence of these problems begins before a child enters school, with eye conditions affecting 5 to 10 percent of pre-school age children (Significant Public Health Challenge, 2012).

Our national population has many influences that can lead to vision impairment and visual disability. There is evidence that populations of differing ethnic backgrounds have increased prevalence of specific medical conditions that lead to visual impairment. For instance, several studies have shown that there is a higher age adjusted rate of blindness among African Americans (1.75 percent) than Caucasians (0.76 percent) (Klein & Klein, 2013).

The age-adjusted risk of un-operated senile cataract among African Americans was also high at 5.25 times that of Caucasians (Klein & Klein, 2013). African Americans also have a higher predilection of primary open angle glaucoma resulting in it occurring 6.6 times more frequently than other ethnicities (Klein & Klein, 2013).

The leading cause of blindness among Caucasians is age related macular degeneration and Caucasians were 2-3 times more likely to develop this condition than other ethnicities (Klein & Klein, 2013). Additionally, within both the African American population and the Caucasian population, there is an equal prevalence of diabetes and diabetic retinopathy. These are conditions that can result in significant ocular complications (Klein & Klein, 2013) especially when not appropriately treated in a timely manner.
2.4: Vision Impairment and Provider Communication

Significant progression of ocular disease and significant vision impairment can occur if chronic eye disease is not properly monitored by the eye care provider and treated in a timely manner. Appropriate monitoring intervals have been outlined by organizations such as National Institute of Clinical Excellence, the European Glaucoma Society, American Academy of Optometry, the American Academy of Ophthalmology and the American Optometric Association (Tatham & Murdoch, 2012). If the interval between examinations is inappropriately long, patients may experience progression that might otherwise have been prevented.

2.5 Patients with Vision Impairment and Quality of Life

Visual function is important for optimal orientation in functional and social life, as well as positive physical and emotional well-being (Adigun, Oluleye, Ladipo, & Olowookere, 2014). Visual impairment, therefore, leads to restrictions in all aspects of daily living and is related to a reduced quality of life (Adigun et al., 2014).

Man is primarily visually motivated for survival. Sight is thought to account for about 80% of the function of all the five senses combined (Adigun et al., 2014). The degree of impairment, personality, intelligence, background, and coexistence with other disabilities all have varying effects on the individual. For many loss of vision can be devastating (Adigun et al., 2014).
Quality of life is described by the World Health Organization as the individual’s perception of their position in life in the context of culture and value system in which they live and in relation to their goals, standards and expectations and concerns (Adigun et al., 2014). As an individual struggles with chronic conditions, assessing quality of life can be a good evaluation of effectiveness of treatments. Estimating quality of life has become a central outcome for treatment, prevention and support (Adigun et al., 2014). Studies have revealed that patients with increasing visual impairment had a poor quality of life (Adigun et al., 2014). In a study conducted within Ibadan, Nigeria comparing vision related quality of life to visual impairment, there was a significant association of blindness to poor quality of life in forty one percent of patients (Adigun et al., 2014). Blindness created a far greater loss of quality of life in comparison to those who had low vision, at thirteen percent, and those with near normal vision at three percent (Adigun et al., 2014). Quality of life was particularly poor in those who reported a perceived severe visual impairment and was associated with reduced functioning and social interaction (Adigun et al., 2014).

2.6: The Role of Inter Professional Communication

The essential goal of the communication between healthcare providers is to transmit important information that permits the ideal treatment of the patient (Coulter, Noone, & Goldacre, 1989). Optimal communication among physicians is characterized by the accurate gathering and sharing of information about the patient, taking the time to expeditiously communicate information that will be useful to other health care
practitioners. This vital information includes; indicating what the patient has been told, planning who will take ongoing responsibility for the patient and keeping the door open for further communication (Coulter et al., 1989).

Patients want to know that their health care practitioners work together effectively, involve the patient in important decisions, are in meaningful dialogue about the problem, and communicate a consistent therapeutic approach (Reames & Dunstone, 1989). If communication is effective between all parties, all aspects of patient care can be addressed, which significantly reduces the chances of clinical omissions to or repetitions of care.

2.7 Challenges with Inter-Professional Communication

There have been a few studies reviewing subjective opinions of specialists and general practitioners within the referral communication process. In a study between general practitioners and specialists it was found that general practitioners had a tendency to provide incomplete information (Reames & Dunstone, 1989). Alternately general practitioners felt the specialists report sometimes did not have complete information regarding the patient case (Berendsen et al., 2009).

Communication difficulties may occur due to the various subcultures of physicians. The intellectual bases, site of practice, type of patient concerns, and prevalence of disease encountered differs among physicians (Hensel, 1994). Primary care doctors are likely to be more patient-oriented (Hensel, 1994). In general, specialists are often more disease oriented. Specialists enjoy complex medical problems, feel more comfortable with
technological interventions, and may place less importance on getting to know their patients as people and as individuals (Hensel, 1994). Unfortunately this can lead to misunderstandings, stereotyping and prejudice, resulting in non-communicated expectations, unmet needs, frustration, and poor patient compliance. This cultural gap is further exacerbated by the fact that primary care physicians and consultants often have little professional communication (Hensel, 1994).

2.8 Poor Communications and its Consequence

Poor communication between the co-managing healthcare professionals can affect both the providers and the patients. A doctor who consistently refers patients to specialists for consultation and the specialist fails to communicate his findings, can result in non-necessary referrals. Poor communication can also result in increased litigation risks for both co-managing providers (Hensel, 1994). Faulty communication between providers directly affects the patient, often resulting in unnecessary, repeat visits to providers. Patients must then bear the additional costs and frustrations arising from repeat visits additional testing, and delays in their diagnosis and treatment.

In this process of ambiguous communication, patients potentially lose faith in the medical profession (Piterman & Koritsas, 2005). With poor communication, data may be lost, patient expectations may be unclear, and there may be an erosion of the physician-patient relationship (Piterman & Koritsas, 2005). It is therefore necessary to investigate ways in which communication among healthcare providers can be improved (Piterman & Koritsas, 2005).
2.9 The Standard of Referral Letters

Communication between health care providers occurs in various ways including telephone, informal conversations and referral letters. Currently the practice of writing referral letters is the most common mode of communication between health care professionals (Coulter et al., 1989). Several studies have studied the most appropriate referral letter structure and a few have suggested standards to which referral letters should adhere.

In one study, findings from a literature review developed a set draft of referral headings, which were reviewed by providers. According to this study, standards for information that should be included in successful referral letters included: patient demographics, general physician practice, referral details, special referral requirements, patient history, examination findings, assessment scales, relevant clinical risk factors, investigation and results, family history, social context, patient and care concerns, medications and medical devices, allergies and adverse reaction, legal information, information given by provider, person completing letter, and distribution list (Royal College of Physicians, 2013). This standard is comprehensive and helpful in establishing essential information to be transmitted between providers.
2.10 The Challenge of Referral Letters

Due to the wide-ranging nature of information needed to transmit to the consulting provider there is often erroneous or missing information sent by the referring provider. Many studies have indicated that referral letters as a form of communication may be inadequate because insufficient data are included in the letter (Coulter et al., 1989).

Each business day doctors initiate communication with letters regarding their patients. Although referral letters are in common use, their quality and content can be quite variable (Jiwa, Walters, & Mathers, 2004). Consulting physicians and general physicians both express frustration about the content of letters they receive. Specialists often report that they do not receive enough information to adequately address the problem (Gandhi et al., 2000). Specialists state that too often referral letters from general physicians (GP’s) lack information about the reason for consultation, sociopsychological factors, or plans for follow up (P. T. Williams & Peet, 1994). Specialists also express concern regarding the absence of information about clinical findings, test results and details of prior treatment (Tattersall, Butow, Brown, & Thompson, 2002).

Overall, specialists report that the most important information they need from the GP is the information about the problem to be addressed, clinical questions to be answered, details the patient is unable to provide, medical problems and medications (Tattersall et al., 2002).
GP’s express dissatisfaction with the time it takes specialists to send their return letter reporting findings on the referred patient. Less than a quarter of GP’s feel the specialist letter arrives on time and patients are of the same opinion (Berendsen et al., 2009). Often patients feel that secondary care physicians, or specialists, have provided inadequate communication concerning follow up or details as to whom further questions should be addressed (Berendsen et al., 2009).

2.11 Comparing Referral Letters to Standard Form Letters

The most common intervention aimed at improving the quality of referral and response letters are those that use form letters or standard letters (Berendsen et al., 2009). Form letters, or consult forms, are defined to be available in to two different formats; that of a detailed form and a brief form. A detailed form gives a complete analysis of the patient’s condition (Navarro, Miranda, Onofre, & Sposto, 2002). The disadvantage of the detailed form is that it may be more difficult for the recipient to review and quickly obtain the desired information. The advantage of the brief form is that it is more focused on the topic of interest. The disadvantage is that it may fail to capture all the information desired by the recipient (Navarro et al., 2002) Research has been conducted into the use of form letters, which is a structured or standardized referral letter, and reported improvements in the quality of referral letters after the induction of the form letter (Couper & Henbest, 1996).

Standard form letters have been created by multiple organizations and have advantages and disadvantages to each. Recent work has studied which aspects of the form
letters are important to both general physicians and specialists. These forms vary greatly in the information contained within the form and the general format (Navarro et al., 2002). One of the studies provided specialists with a standard letter to complete as a reply to GP’s and found that they contained more information than non-standard letters (Couper & Henbest, 1996). Various organizations have attempted to create a form to be used in communication between optometrists and other members of the health care team. Medical Institutions, such as hospitals, often use standard form letters in order to homogenize care and improve the quality of transmission of information (Navarro et al., 2002). In a study comparing standard verses non-standard letters, eighty seven percent of the standard form letters were from hospitals and public health institutions, three percent were from private professionals, and 10% were not identified due to the lack of information (Navarro et al., 2002). Within hospitals professionals commonly provide services based on a rotating shift system which would lead to highly heterogeneous procedures, if there were no standardization of care. Standard letters contained a larger amount of information with respect to almost all items of the referral (Navarro et al., 2002).

Studies have shown that the average rate of clinical files with no referral letter is about 66%. This lack of clinical communication and follow through has a strong potential for detriment to quality patient care. When no referral letters are issued, serious potential adverse outcomes can be delayed diagnosis of serious ocular and systemic conditions and patient loss to follow up by non-attendance at the referral appointment (Navarro et al., 2002). Adequate referral letters containing clear information about clinical details is the
beginning of successful treatment and is also essential for efficient contacts between professionals. Standard letter use is suggested in referral communications, because standard letters are more complete (Navarro et al., 2002).

2.12 Referral Communication via Telephone

Referral letters are the standard of care within the healthcare community for communication between providers. Standard form letters have been added to the communication methods and have moved into prominence with their ease of conveying medical information. The third most used method to transmit referral information to a consulting provider is through telephone communications.

Telephone referral communication allows for clarity on unclear information within referral data and allows for an ease of transitioning patients from general physician (GP) to specialist. Although it is a helpful mode of communication, providers are not as readily available when telephone communication is initiated. It has been found that there is a difference in the availability for telephone communications, or telephone accessibility, between GP’s and specialists. Use of telephone communication is more prevalent with GP’s than specialists, GP’s were found to initiate telephone communication directly with the specialist 36.9% of the time while specialists sought telephone communication directly with the GP’s 21.5% of the time (Berendsen et al., 2009). Initiating referral communications via telephone is a helpful tool to transition patients to the consulting providers and to communicate details regarding patient care between providers. Referral communications are an integral aspect of patient care and can influence patient prognosis.
for resolution of disease. Patients who reach their specialist providers in an appropriate
time frame have the potential to achieve treatment of ocular conditions in a timely
manner.
Chapter 3: Introduction, Pilot Study

A review of clinical practice literature indicates that an assessment of interprofessional communications initiated by the optometric profession is research that has not been conducted. The lack of such data limits the ability to determine the effectiveness of various types of referral communications.

The need for effective provider communication is growing as the incidence of vision impairment increases throughout the United States of America. Within the United States cases of early age related macular degeneration are expected to double between 2010 and 2050 from 9.1 million to 17.8 million (a significant pubic health challenge, 2013). The cases of diabetic retinopathy among people 65 years or older are expected to quadruple by 2050 from 2.5 million to 9.9 million and the estimated number of people aged 40 years and over with cataracts is expected to rise to more than 30 million (a significant pubic health challenge, 2013).

It is vital that providers within the medical profession become aware of best communication practices to combat the changing health dynamic of the American population. The Analysis of the Ohio State University College of Optometry (OSUCO) Clinical Referral Process is an initial venture into understanding factors that promote effective referral provider communications and factors that discourage patient compliance in the referral process.

3.1. Pilot Study
Prior to initiating a full research study assessing referral data from the OSUCO’s medical records, a feasibility study was initially conducted. The purpose of the feasibility study was to determine if sufficient electronic health record (EHR) data were available in a consistent format that would allow for appropriate tabulation. An assessment of the available data pertaining to referral communications and an initial analysis of factors that influenced referral attendance was studied.

3.2 Methods- Pilot Study

3.21 Subject Eligibility and Recruitment for Pilot Study

Persons eligible for the study were all patients of the OSUCO who were referred to a specialist for further treatment. Patients were recruited through a query of the OSUCO electronic medical records system for medical records that were associated to “Letter Dr Out”. This referral letter is associated to the EHR with the tag “Letter Dr. Out”. The recruitment goal was to obtain 50 medical records of patients who were referred to consulting providers. When a patient is referred to a specialist provider, the current standard of care within the OSUCO clinic system entails drafting a referral letter that summarizes the reason for the referral.
3.22 Guidelines for Data Collected for Pilot Study Review

Data that were obtained from the EHR entailed patient demographics and information regarding the referral process. The data were collected within a secure password protected Microsoft Excel database, on the OSUCO computer system server. All patient contact information was kept confidential and not connected with referral data.

The specific data that were collected included: patient record number, age, ethnic background, clinic originating the referral, referral diagnosis, specialist to whom the patient was referred, indication of the referral, appointment time and date, and presence of a consultation letter from the specialist. Patients that were under the age of 18 were not included in the study, because as a minor they did not likely have the ability to choose their method of care, could not effectively comment on the quality of appointment communications, and did have not likely influence on the attendance to the referral appointment. Patients who were mentally disabled were also not included in the data as they might not be able to comment on their appointment communications or have a significant influence in their method of care.
Chapter 4: Results, Pilot Study

4.1. Subject Participation-Pilot Study

Medical records from OSUCO clinics were reviewed between April 2013 and May 2013. Forty-nine medical records were identified and patients’ referral information was documented.

4.2. Referral Data- Pilot Study

Referral data from all forty-nine medical records were collected. Gathered data included: patient record number, age, ethnic background, originating clinic, referral diagnosis, and specialist to whom the patient was referred. Two key data points were not found in every record: 1) date and time of the referral appointment 2) a consulting letter from the specialist.

4.3 Statistical Analysis-Pilot Study

In this study the central hypothesis was that each variable did not have an influence on attendance at the referral appointment. The alternate hypothesis was that there was a relationship between each variable and the outcome measure. To test these hypotheses data were entered into a Microsoft Excel spreadsheet and further analyzed using a Chi-Square test. This statistical analysis assesses the distribution of categorical, non-numeric,
data and differences between values. Comparisons between observed data occurred with data that is expected, according to the central hypothesis. In this research for example, the expected result is that each variable would have no effect on attendance. The chi-square assesses if the deviations between observed data and expected data are due from chance or due to other factors. Each variable and its association to attendance at the referral appointment are assessed via Chi-square analysis and the resulting p-value obtained. The p-value is the assessment on what is the probability that this association occurred by chance. This p-value is then compared to the alpha value. The alpha value is the probability of a Type 1 error, which is the error when the null hypothesis is rejected when it is actually true. The alpha value for this study is .05 and if the p-value is smaller than alpha for this study than the central hypothesis of no association can be rejected as it does seem to have an association. In addition, if the p-value is larger than alpha than the study would fail to reject the central hypothesis as that variable does not seem to have an association.

4.4 Patient Demographics- Pilot Study

Referral data from all forty-nine medical records were collected. Medical record review revealed that the average age of patients was approximately 54 years but ranged from 21-86 years. Patient ethnicity was predominately Caucasian, 73%, with African Americans at 10% and Asians at 6%. Referral’s from OSUCO clinics to specialists were highest with the Primary Vision Care clinic at 34.69%, Binocular Vision Care clinic at 20.41%, Low Vision Clinic at 16.32%, Advance Ocular Care Clinic at 16.32% and
Contact Lens Clinic at 4.08%. Predominant referral diagnoses include Cataracts at 18.37%, Glaucoma at 10.20%, and Diabetes at 4.08%, and Visual Field deficits such as Superior Homonymous Hemianopia at 6.12%.

4.5 Communication Methods-Pilot Study

Referrals were communicated using “Letter Only” 51% of the time. “Letter and Phone Call” communications were used in 45% of referral communications. The “Letter and Phone” communication method entailed referral letters and telephone calls initiated by the optometrist or staff member to the specialist office to schedule the patient’s referral appointment.

4.6 Associations that Lead to a Scheduled Referral Visit- Pilot Study

Referral visits were scheduled for all of African Americans (n=5) and Asian (n=3) patients. Only 69% of Caucasian (41 total Caucasian patients) patients were scheduled for a referral appointment. Patients who had examinations within the Advance Ocular Care (AOC) clinic or Low Vision (LV) clinic were more likely to schedule a referral appointment with a 100% scheduling rate when compared to patients within the Binocular Vision (BV) clinic (70% were scheduled) or Primary Vision Care (PVC) clinic (71% were scheduled).

Seventy one percent of patients who were referred to a neuro-ophthalmologist (N=7) scheduled a referral appointment. Seventy seven percent of the patients who were referred to a general ophthalmologist (N=31) were scheduled for a referral appointment.
while 20% of patients referred to a primary care physician (N=5) were scheduled for an appointment.

“Letter Only” referral communications resulted in only 52% of patients scheduled with a referral appointment. Patient referrals entailing “Letter and Phone Call” resulted in 91% of patients scheduled for a referral appointment ($p = .003$)

4.7 Associations with Positive Referral Attendance-Pilot Study

Patient age did not differ for those patients who attended their referral appointment verses those patients who failed to attend the referral appointment. Approximate age for those who attended their referral appointment was 56.1 years while average age for who failed to attend the referral appointment was 56.9 years. Ethnicity of those who attended their referral appointment did not impact the likelihood that a referral appointment would be completed. Eighty percent of all African American patients attended the referral appointment while 64% of all Caucasian patients attended the referral appointment. Asian patients attended the referral appointment 33% of the time.

Findings revealed that 67% of all patients examined in LV clinic, 60% in BV clinic, 58% of all patients examined in PVC clinic, and 50% in AOC attended their referral appointment. Predominant specialists to whom patients attended the referral appointment were: 60% to the neuro-ophthalmologist, and 71% to a general ophthalmologist ($p = .10$).

While a “Letter and Phone Call” referral communication increased the likelihood that the referral appointment would be scheduled, it did not have an equivalent effect on the referral appointment completion. Patients who were referred by “Letter Only” referral
communication methods attended their referral appointment 79% (p=.092) of the time while only 50% of “Letter and Phone Call” referral communication patients attended their appointment.
Chapter 5 Discussion, Pilot Study

Although there is not a strong association between factors and attendance at the referral appointment there are several strong factors that seemed to influence scheduling of the referral appointment. The statistical analysis of this study indicates that patient attendance at referral appointments does not have an association with any one variable assessed in this study. Referrals using the “Letter Only” communication method resulted in 79% of patients attending the referral appointment, while only 50% of patients attended the referral appointment with the “Letter and Phone Call” combination communication methods.

5.1 Referral Appointment Scheduled- Pilot Study

These findings indicate that there are several factors that have an association with whether a patient schedules a referral appointment to the specialist provider. These factors include communication method, ethnicity, and type of referral specialist.
5.12 Communication Method Utilized and Scheduling the Referral Appointment-Pilot Study

A significant association was found between the referral communication method and referral appointment being scheduled. Referral communication using a “Letter and Phone Call” resulted in a higher likelihood that the patient would be scheduled for the referral appointment than when the “Letter Only” was used as the communication method. The “Letter and Phone Call” communication entails the doctor or staff member calling the specialist’s office to schedule a referral appointment for the patient as well as sending a referral letter. In this study, 52% of patients with a “Letter Only” as a referral communication method scheduled a referral appointment, while 91% of patients with “Letter and Phone Call” as referral communication method scheduled a referral appointment (p=.003). The reduction of scheduling from 100% may be due to patient commitment to referral appointment and patient schedule conflicts.

This finding indicates that to further promote patients scheduling referral appointments, optometrists and/or staff members should complete a phone call to the specialist office to schedule the appointment for their patient. It could also be hypothesized that patients who have a scheduled their referral appointment are more likely to receive telephone, written, or electronic reminders of their appointment from the specialist and may be more likely to attend the referral appointment.
5.13 Ethnicity and Referral Appointment Scheduled-Pilot Study

There was an association between patient’s ethnicities and referral appointments scheduled. African American patients and Asian patients were more likely to schedule a referral appointment than Caucasian patients (p= .10)

Specific factors that may have promoted or deterred some ethnicities from scheduling a referral appointment were not tested within this study. There can be several factors within a patient’s culture that may influence his or her decision to schedule a referral appointment. Each culture may have cultural norms, which lead patients to perceive doctor instructions with a certain sense of necessity. The opposite may also occur in which a doctor’s instruction is not highly regarded, thereby resulting in the patient’s disregard of the doctor’s instructions. Also, factors outside of a patient’s culture could influence a patient’s decision to schedule a referral appointment, such as transportation challenges and financial difficulties that may make paying for additional appointments a challenge. Patient work, school and family obligations may also be contributing factors to low referral completion rate. There are numerous factors beyond the scope of this study that can be assessed in the relationship of ethnic decision making and scheduling a referral appointment before any plausible conclusions can be made.

5.14 Specialist Provider to Whom Patient is Referred and Referral Appointment Scheduled- Pilot Study

There was an association between the type of specialist provider and scheduling of the referral appointment. There were higher percentages of patients who scheduled a
referral appointment when being referred to a neuro-ophthalmologist or a general ophthalmologist in comparison to a primary care physician. There was over a fifty percent increase in scheduling of referral appointments with ophthalmologists than with primary care providers. Although this is significant, further testing is necessary to truly assess relationship between specialist provider and scheduling of the referral appointment before any reasonable conclusion can be assessed.

5.15 Referral Appointment Attended-Pilot Study

It was found that there is no clear relationship of various aspects of the referral process and attendance or completion of the referral appointment. This finding is surprising as it could be hypothesized that if a referral appointment is scheduled it would be more likely that attendance to the referral appointment would occur successfully.

5.16 Patient Demographics and Attendance to Referral Appointment-Pilot Study

There was no significant relationship between age and ethnicity of patients when assessing association with attendance to the referral appointment. Average age of patients was the same for those who completed the appointment in comparison to those patients who failed to attend the referral visit. As with age, ethnicity did not seem to have an impact on the likelihood that a referral appointment would be completed.
5.17 Clinic of Initial Eye Examination and Attendance to the Referral Appointment, Pilot Study

There was not significant relationship between the initial referring clinic of eye examination and attendance to the referral appointment. Attendance to the referral appointment had no positive correlation with the clinic in which the patient was first examined.

5.18 Communication Methods and Attendance to the Referral Appointment-Pilot Study

While a phone call in conjunction with the referral letter increases the likelihood that the appointment will be scheduled, it does not have the equivalent effect on attendance at the referral appointment. “Letter only” referrals had a 30% higher attendance to referral appointments than “Letter and Phone Call” combination communication methods (p=.092). This p value indicates that this result could have occurred by chance because it has a high margin of error. It is possible that a larger sample size could result in more significant results.

5.19 Potential Limitations- Pilot Study

This pilot study was initiated to assess the feasibility of obtaining referral data from medical records within the Ohio State University’s College of Optometry (OSUCO). To make this assessment, a sample of fifty medical records was evaluated. It was found that occasionally, medical record documentation did differ between records due to provider
and clinic variations in recording of medical data. These differences did pose a challenge in collecting all needed data to truly assess referral patterns.

EHRs were introduced into the OSUCO computer system in 2011. With every new technological implementation, there are learning curves that each new provider, student and clinic must overcome. Due to these learning curves, documentation of referral details was not consistent throughout each medical record. Location of referral details within the medical record varied, which made electronic tracking of pertinent data difficult.

Certainty of data availability was also a concern. A provider may have initiated a phone call and sent a letter to the specialist to complete the referral but may not have recorded this within the medical record. If it was recorded, it may have been found in several different locations within the EHR. This would require a search of the entire medical record to ensure that all referral data was recovered for this study. This variation in recording and documentation may have reduced the ability to locate and assess associations between various factors and the outcome measure of attendance at the referral appointment.

Within this small sample of medical records, there were many more Caucasians than other ethnicities. Such small numbers of patients does not give a true indication of patterns in patients of different ethnic backgrounds. This lack of minority patients prevented fully being able to evaluate the role of race in scheduling and completing referral appointments.
This same challenge presented itself in assessing relationships between specialty providers, communication method within the referral and attending referral appointments. Reduced sample size did not allow for accurate associations to be revealed.
Chapter 6: Conclusion- Pilot Study

Conclusions of the pilot study included:

1. Despite variations in documentation between providers and clinics, the pilot study determined that it was feasible to obtain referral data from the OSUCO medical record system.

2. “Letter and Phone Call” combination referral communications resulted in a higher likelihood that the referral appointment would be scheduled with the specialist provider.

3. Ethnicity may be a small predictor on whether a referral appointment will be scheduled.

4. There was an increase in scheduling of appointments when patients were directed to schedule with a neuro-ophthalmologist or ophthalmologist. There may be additional factors that influence a patient’s willingness to schedule with a medical specialist. Further testing is necessary to assess confounders and true relationships between variables.

5. Even with the determination of relationships between scheduling of the referral appointment and several aspects within the referral process, there was not a clear correlation between factors and attendance at referral appointments. Patient demographics, clinic of initial eye examination and communication method
within the referral, each did not have a significant correlation with attendance to
the referral appointment.

6. A primary outcome measure of the study was assessing relationships between
various factors and attendance at the referral appointment. Within this smaller
sample, a direct correlation with attendance to the referral appointment was not
found.

7. Patient interviews, assessing effectiveness of communication methods,
optometrist communication, and urgency of referral would also be useful in
understanding patient decision making for scheduling and attending referral
appointments. Further study assessing results from interview questions and
relationships with attendance to appointments could increase our understanding of
patient decision making when scheduling a referral appointment.
Chapter 7: Introduction: Subsequent Study

The Analysis of the Ohio State University College of Optometry Clinical Referral Process Pilot Study was an initial study of the feasibility of obtaining referral data from medical records at OSUCO. In this pilot study research, a relationship between referral processes and scheduling of referral appointments was revealed. No direct relationship, however, was found when evaluating the referral processes and attendance at the referral appointment. The pilot study did determine that it was feasible to retrieve referral data from medical records at OSUCO, making further collection and analysis of referral data possible and optimistically productive. A larger sample size and more in-depth analysis of patient interviews may reveal stronger correlations within the clinical referral process.

7.1 Subsequent Study

The Analysis of the Ohio State University College of Optometry Clinical Referral process subsequent study is research that furthers the aims of the pilot study. This subsequent study utilizes a larger sample size of medical records and patient telephone interviews to enhance data analysis.
7.12 Sample Size

In the pilot study, there was a sample size of fifty medical records that was reviewed for assessment of feasibility. In statistical testing there should be an assessment of what sample size can bring about a clinically meaningful difference for that experiment as well as a statistically significant result. Specific mean difference is the value by which that outcome measure is deemed as significant for the researcher. In this study, it is the specific difference that is deemed clinically meaningful in its result. The sample size should be chosen to maximize the chance of obtaining that clinically meaningful result as well as statistically significant result.

Statistical significance is assessing the probability statement on how much the observed difference in the result is due to chance only. In assessing sample size for the subsequent study the clinically meaningful difference between communication methods was assessed as a 50% increase between methods. From the appropriate statistical calculations it was reasonable to enroll fifty-five patients referred to a specialist using a “Letter Only” and thirty-five patients referred to a specialist using “Letter and Phone Call” communication methods. This would yield approximately one hundred patients under study that could produce a clinically meaningful difference as well as a statistically meaningful difference.
7.13 Patient Interviews

In the subsequent study, to gain a better greater understanding of patient perceptions of the referral process, patient interviews were initiated. Institutional Review Board approval was petitioned and received. Appropriate safety and conduct measures were initiated for human subjects research. Interview questions were created to address possible motivational factors related to referral communications and their effect on attendance to referral appointments. Specifically, the subsequent study aimed to address mitigating factors outside of referral communication factors that may have influence on attendance to referral appointments. Factors of interest included economic constraints, transportation constraints, communication between optometrist and patients, perceived level of urgency for the appointment and its affect on attendance to the referral appointment. Each of these factors was hypothesized to potentially influence patient decision making when attending referral appointments. Further study to assess each factors influence may reveal significant results when reviewing influences on attendance to referral appointments.
Chapter 8: Methods- Subsequent Study

Medical records of patients who were referred from OSUCO clinics to specialist providers were collected and reviewed for data specific to the referral process. Each of these patients who were referred were also telephoned and requested to participate in a short phone interview on their perceptions of the effectiveness of the communications within the referral.

8.1 Subject Eligibility and Recruitment-Subsequent Study

Persons eligible for the study were all patients of the OSUCO who were referred to a specialist for further treatment between 2011 and 2014. Patients’ records were identified through a query of the OSUCO EHR system for medical records that were associated with the “Letter Dr Out” tag. Current standard of care protocol within the OSUCO clinics entails the generation of a referral letter summarizing the reason for any referral to a consulting specialist. This referral letter is then scanned in to the EHR and associated to the EHR with the tag “Letter Dr. Out”.

The recruitment goal was to obtain 100 medical records of patients who were referred to consulting providers, resulting from a pool of a total of 200 charts. Following the collection of medical records of those referred, each of these 100 patients would be
telephoned to obtain verbal consent of participation in the study and a short telephone interview.

8.2 Guidelines for Data Collected from Medical Record Review-Subsequent Study

Medical data obtained from the medical records were patient demographics and information regarding the referral. The data were collected within a secure Microsoft Excel sheet that was password protected on the secure server within the OSUCO computer system. All patient contact information was kept confidential and disconnected from data related to their referral diagnosis. The specific data that were collected was as follows: patient record number, age, ethnic background, clinic originating the referral, referral diagnosis, specialist to whom the patient was referred, chart notation indicating date and time of the referral appointment and presence of a specialist consultation letter indicating that the patient went to the referral appointment. The category indicating who scheduled the appointment was flagged by EHR notation stating that the optometrist (or staff member), made the referral appointment for the patient.

Patients that were under the age of 18 were not included in the study, because as minors, they did not have the ability to choose their method of care, could not effectively comment on the quality of the appointment communication and did not likely have significant influence on their attendance to the referral appointment. Patients who were mentally disabled were also not included in the data because they could not effectively comment on appointment communication and could not likely influence their method of care.
8.3 Design of the Patient Telephone Surveys-Subsequent Study

The questions contained within the telephone survey were designed to assess patient perceptions of the effectiveness of communication between providers. Patients were asked if their optometrist clearly explained the urgency, and/or importance of their referral to the specialist provider. Questions were meant to illicit specific concerns that patients may have had regarding comprehension and understanding of their optometrist’s communication.

The interview form used Likert statements that elicited one of five answers from the patient: strongly agree, agree, neutral, disagree, or strongly disagree. This method of survey provided an avenue for the collection of an unbiased set of responses to receive from patients. Statistical assessment is optimal with the Likert method, allowing for true statistical correlations to be assessed from the patient telephone surveys.

8.4 Correspondence with Subjects-Subsequent Study

During the study, patients were contacted via telephone to initiate the interview on patient perception of provider communication. Participants were given information about the study, confidentiality information and verbal consent to participate was recorded. Participants were instructed to contact the principal investigator if they had any questions. The patients were also made aware that they were free to discontinue the study at anytime without question.
8.5. Statistical Analysis- Subsequent Study

The central hypothesis of this study stated that each variable did not have an influence on attendance at the referral appointment. The alternate hypothesis was that there was a relationship between each variable and the outcome measure. To test these hypotheses data were entered into a Microsoft Excel spreadsheet and further analyzed using a Chi-Square test. This statistical analysis assesses the distribution of categorical, non-numeric, data and differences between values. Comparisons between observed data occurred with data that is expected, according to the central hypothesis. In this research, for example, the expected result is that each variable would have no effect on attendance. The chi-square assesses if the deviations between observed data and expected data are due from chance or due to other factors. Each variable and its association to attendance at the referral appointment are assessed via Chi-square analysis and the resulting p-value obtained. The p-value is the assessment on what is the probability that this association occurred by chance. This p-value is then compared to the alpha value. The alpha value is the probability of a Type 1 error, which is the error when the null hypothesis is rejected when it is actually true. The alpha value for this study is .05 and if the p-value is smaller than alpha for this study than the central hypothesis of no association can be rejected, as it does seem to have an association. Conversely, if the p-value is larger than alpha, then the study would fail to reject the central hypothesis, as that variable does not seem to have an association.
Chapter 9: Results: Subsequent Study

Seventy-nine subjects between the age of 21 and 93 years were enrolled in the study between March 2014 and May 2014. They were recruited from the medical records of The Ohio State University’s College of Optometry (OSUCO). The average (+SD) age was 57.56+/−16.50 years. Subjects reported that, 57 patients (72.15%) were of Caucasian descent, 14 patients (17.72%) were of African-American descent, 3 patients (3.80%) were of Asian descent, one patient (1.27 %) was of Somali descent, 2 (2.53%) were of Hispanic descent, and 2(2.53%) declined to answer regarding their ethnic background.

Referral appointments generated were assessed from several specialty clinics within OSUCO. Thirty-Five referrals, (44.30%) originated from the Primary Vision Care clinic, 17 referrals (21.52%) from the Low Vision Clinic, 14 referrals (17.72%) from the Binocular Vision clinic, 8 referrals (10.12%) originated from the Advance Ocular Care clinic, 4 referrals (5.06%) from the Contact Lens Clinic, and 1 referral (1.27%) from the Traumatic Brain Injury clinic.

Health conditions prompting referrals were also varied. The most prevalent conditions for referral were 15 (18.99%) cataracts, 4 (5.06%) proliferative diabetic retinopathy, and 3(3.80%) glaucoma.

Patients were referred to the following specialists: 50 patients (63.29%) to a general ophthalmologist, 9 patients (11.39%) to a neuro-ophthalmologist, 9 (11.39%) to a
primary care physician, 5 (6.33%) to a retinal specialist, 2 (2.53%) to a glaucoma specialist, 2 (2.53%) to an emergency room ophthalmologist, 1 (1.27%) to a binocular vision specialist, and 1 (1.27%) to a general neurologist.

9.1 Referral Communications Utilized for Referral-Subsequent Study

On of the two patients referred to the emergency room was referred by phone call only. Because phone call only was not a communication method being studied in this investigation, this referral was not included in further analysis. Therefore, the total of patients referred dropped to seventy-eight. “Letter Only” referral communications were used for 49 (62.03%), patients and “Letter and Phone Call” method was used for 29 (36.71%) patients. The average age for patients for whom a “Letter Only” referral was used was 58.31 +/- 17.28 years, and for “Letter and Phone Call” referral was 56.84 +/- 16.24 years.

9.2 Associations with Ethnicity and Referral Communications-Subsequent Study

Comparisons of ethnicity and referral communications showed that Caucasians were more likely to have “Letter Only” communications used in their referral when compared to all other ethnicities combined, excluding the two patients that declined to answer (p= .019). Within the remaining seventy-six patients, the distribution of each ethnicity by referral communication was the following: patients that had “Letter Only” used in their referrals: 39 Caucasian patients (69.64% of all Caucasians), 6 African American patients (42.86% of all African Americans), one Asian (33.33% of all Asians), and one Hispanic (50.00% of all Hispanics).
The distribution of each ethnicity that had “Letter and Phone Call” used in their referral is the following: 17 patients (30.36% of all Caucasians), 8 patients (57.14 of all African Americans), 2 patients (66.67%) of all Asians, one (100.00) of all Somalis, and one (50.00%) of all Hispanics.

9.3 Associations with clinic of initial examination and referral communications-

Subsequent Study

Patients coming from the Binocular Vision (BV) clinic and the Low Vision (LV) clinic were more likely to be referred using “Letter Only” communications (p=. 036). Of the forty nine referrals that used “Letter Only”, the distribution of clinic of initial examination was the following: BV clinic referred 12 patients (85.71% of all referral communications), LV clinic referred 13 patients (76.47% of all referral communications), PVC clinic referred 19 patients (54.29% of all referral communications), AOC referred 2 patients (25% of all referral communications), CL clinic referred 2 patients (66.67% of all referral communications) and TBI referred one patient (100% of all referral communications).

Within the twenty nine referrals that used “Letter and Phone Call” communications, the distribution of clinic of initial examination was the following: 16 referrals (45.71%, of all referral communications) in PVC clinic, 6 referrals (75% of all referral communications) in AOC clinic, 4 referrals (23.5% of all referral communications) in LV clinic, 2 referrals (14.29) of all referral communications) in BV clinic.
clinic, one referral (33.33% of all referral communications) in the CL clinic, and there were no “Letter and Phone call” communications in the TBI clinic.

9.4 Associations of Specialist to whom patient is referred and referral communications-Subsequent Study

There were no statistically significant associations between specialist to whom patient is referred and type of referral communication used. The predominant specialist to who patients were referred was the general ophthalmologist at 64% and primary care physician at 10%.

9.5 Associations with Scheduling at the Referral Appointment-Subsequent Study

A statistically significant number of patients for whom OSUCO clinics called to schedule a referral were indeed scheduled for an appointment. “Letter and Phone Call” referrals had 27 (93.10%) of patients scheduled for a referral appointment of all patients for whom “Letter and Phone Call” referral method was used. (p=.015). Reduced scheduling from 100% of patients may have been due to patient commitment to referral appointment and patient schedule conflicts.

“Letter Only” referrals had 16 (32.65%) of patients scheduled for a referral appointment of all patients for whom “Letter Only” referral method was used.

Though not a statistically significant finding, there was an indication that Caucasian patients are less likely to have their referral appointment scheduled for them when compared to all other ethnicities, excluding the two declined to answer patients (p=.093).
Within the forty one ethnicities that scheduled the distribution was the following: three Asian patients (100% of all Asians had a referral appointment scheduled for them), one Somali patient (100% of all Somalis), nine African American patients (64.29% of all African Americans), one Hispanic patient (50.0% of all Hispanics) and 27 Caucasian patients (48.21% of all Caucasians) scheduled a referral appointment.

There was no statistically significant association between clinic of initial examination and the scheduling of a referral appointment. Of the forty three patients that scheduled a referral appointment the distribution of initial clinic of examination was the following: one patient or 100% of all patients referred in the TBI clinic scheduled a referral appointment, seven patients or 87.5% of all patients referred in the AOC clinic scheduled a referral appointment, two patients or 66.67% of all patients referred in the CL clinic scheduled a referral appointment, twenty patients or 57.14% of all patients referred in the PVC clinic scheduled a referral appointment, six patients or 42.86% of all patients referred to the BV clinic scheduled a referral appointment, and seven patients or 41.17% of all patients referred in the LV clinic scheduled a referral appointment.

Also, there was no statistically significant association between specialist to who patient was referred and scheduling of the referral appointment. Within the forty three patients that scheduled a referral appointment the distribution of specialists to whom patients were referred was the following: two patients or 100% of all patients who were referred to a glaucoma specialist scheduled a referral appointment, one patient or 100% of all patients who were referred to a neurologist scheduled a referral appointment, thirty two patients or 64% of all patients who were referred to a general ophthalmologist
scheduled a referral appointment, five patients 55.56% of all patients who were referred to a neuro-ophthalmologist scheduled a referral appointment, two patients or 25% of all patients who were referred to a primary care physician scheduled a referral appointment, and one patient or 20% of all patients who were referred to a retinal specialist scheduled a referral appointment.

9.6 Associations with Attendance at the Referral Appointment-Subsequent Study

It was found that patients with a “Letter and Phone Call” referral were more likely to attend their referral appointment as compared to those with “Letter Only” referrals. There were 14 referrals (48.28%) of all “Letter and Phone Call” referrals that attended the referral appointment. This is compared to 13 referrals (26.53%) of all “Letter Only” referrals that attended the referral appointment (p=.051).

There was no statistically significant association between ethnicity and attendance to the referral appointment. Within the twenty seven patients that attended a referral appointment, excluding the one patient, of those who declined to answer, the distribution of ethnicities was the following: one Somali patient or 100% of all Somalis, six African American patients or 42.86% of all African Americans, one Asian patient or 33.33% of all Asian patients, and eighteen Caucasians 32.14% of all Caucasians.

There was no statistically significant association between clinic of initial examination and attendance to the referral appointment. Within the twenty seven patients that attended the referral appointment the distribution each clinic of initial examination was the following: one patient or 100% of all patients referred from the TBI clinic attended the referral appointment, five patients or 66% of all patients referred from AOC
clinic attended the referral appointment, five patients or 35.71% of all patients referred from the BV clinic attended the referral appointment, one patient or 33.33% of all patients referred from the CL clinic attended the referral appointment, five patients or 29.41% of all patients referred from the LV clinic attended the referral appointment, and ten patients or 28.57% of all patients referred from the PVC clinic attended the referral appointment.

There was also no statistically significant association between specialist to who patient was referred and attendance at the referral appointment. Within the twenty seven patients who attended the referral appointment the distribution for each specialist was the following: four patients or 44.44% of all patients referred to a neuro-ophthalmologist attended the referral appointment, twenty two patients or 44.00% of all patients referred to a general ophthalmologist attended the referral appointment, and one patient or 50.00% of all patients referred to the glaucoma specialist attended the referral appointment. In this study, patients who were referred to the primary care physician, binocular vision specialist, neurologist, and the retinal specialist did not attend the referral appointment. Full summary of association provided on Table #3.

Time interval between the initial examination and the referral appointment did not show a significant association. In addition, patient interviews did not reveal a clear association between patient positive perceptions of optometrist’s communication and attendance to the referral appointment. Optometrists’ communication regarding urgency and importance of attending the referral appointment did not reveal a clear association.
with attendance to the referral appointment and patient’s perception of financial and transportation constraints did not show a significant association with referral attendance.
Chapter 10 Discussion—Subsequent Study

According to this subsequent study patient attendance to referral appointments had an association with “Letter and Phone Call” communications. It was found that patients with a “Letter and Phone Call” referral were more likely to attend their referral appointment as compared to those with “Letter Only” referrals. There were 14 referrals (48.28%) of all “Letter and Phone Call” referral communications that attended the referral appointment. This is compared to 13 referrals (26.53%) of all “Letter Only” referral communications that attended the referral appointment (p = .051). This represents a 21.75% increase in attendance with “Letter and Phone Call” communications. This was an interesting finding because it indicates that there is a statistically significant relationship between “Letter and Phone Call” communications and attendance, but not a clinically meaningful difference. The pre-set clinically meaningful standard set for this study was a 50% difference between communication methods. This finding, if repeatable in future research, could provide evidence for a change in standard of care of referral communications.
10.1 Referral appointment Scheduled-Subsequent Study

The findings from this study indicate that there were two statistically significant
findings associated with scheduling of referral appointments, these variables include
patient ethnicity and referral communications.

10.12 Ethnicity and Scheduling the Referral Appointment- Subsequent Study

It was found that Caucasian patients were less likely to schedule referral
appointments when compared to all other ethnicities, excluding the two patients who
deployed to answer questions about their ethnicity (p=. 093). It was found that there was
a greater likelihood that “Letter Only” referrals were used with Caucasian patients. The.

10.13 Clinic of Initial Eye Examination, Referral Communications and Scheduling of
Referral Appointment, Subsequent Study

This study found that there was no statistically significant association between clinic
of initial examination and the scheduling of a referral appointment. Comparing initial
clinic of examination and the type of referral communications used, it was found that
patients in binocular vision and low vision clinics at OSUCO were more likely referred
through “Letter Only” referral communications. All other clinics used “Letter Only “
communications in reduced frequency.

Additionally, there was a larger number of patients referred from the PVC clinic
when compared to all other clinics. It was found that the PVC clinic referred thirty-five
patients and 57% of these patients from PVC clinic scheduled the referral appointment.
This finding is consistent with the traditional function of the clinics within OSUCO. The PVC clinic is the main clinic that serves as a portal to most of the other OSUCO clinics. Therefore, it is expected that more patients would be seen and referred from this clinic. The BV clinic is significantly smaller and the patients tend to be younger and healthier than those in PVC. Patients in LV clinic already have experienced significant vision loss and therefore the need for specialty referrals is usually less. Each of these clinics is a specialty clinic that tends to receive referrals rather than having patients referred out.

10.14 Specialist to whom Patient is Referred, Referral Communications, and Scheduling the Referral Appointment, Subsequent Study

A direct, significant relationship between specialist and scheduling could not be revealed. There were higher amounts of patients referred from the OSUCO clinics to the general ophthalmologist than other specialties. There were eight patients referred from OSUCO clinics to the primary care physician, with 25% of these patients scheduling a referral appointment, thirty two patient’s or 64% of patients who were referred, scheduled with the general ophthalmologist, and five patients or 55% of patients who were referred, scheduled to a neuro-ophthalmologist.
Communication Method Utilized and Scheduling the Referral Appointment, Subsequent Study

It was found that nearly all patients for whom OSUCO clinics called to schedule a referral appointment were indeed scheduled for an appointment. The “Letter and Phone Call” communication method yielded a schedule rate of 93.10% while the “Letter Only” produced a 32.65% schedule rate.

When left to schedule the referral appointment on their own, about one third of patients scheduled a referral appointment (p=.015). This finding was expected as the scheduling of the referral appointment was enacted by the optometrist or staff member and would have occurred at the initial examination. In addition, patient commitment to referral appointment and patient schedule conflicts may have reduced scheduling from 100% scheduled.

Communication Methods and Attendance at the referral appointment-Subsequent Study

A statistically significant relationship was found between the “Letter and Phone Call Communications” referral communication method and attendance at the referral appointment. It was found that patients with a “Letter and Phone Call” referrals were more likely to attend their referral appointment compared to those with “Letter Only” referrals. There were 14 referrals (48.28%) of all “Letter and Phone Call” referral communications that attended the referral appointment. This is compared to 13 referrals (26.53%) of all “Letter Only” referral communications that attended the referral
appointment ($p=0.051$). This is a 21.72% difference in attendance at the referral appointment between the referral communication methods. Though this difference in attendance at the referral appointment was statistically significant it was not a clinically meaningful difference in attendance. The standard set for this study was set at 50% and the results indicate that although there was a difference between the referral communications it was not enough of a difference to change current clinical practice.

Current standard of care is to draft a referral letter to send to the specialist when a referral is initiated. The finding of this study that indicates that “Letter and Phone Call” referrals may have a higher likelihood of attendance provides a stimulant for further research. This finding, if repeatable in future study, could provide evidence for a change in clinical practice and the potential for an increase in attendance at appointments. Patients who attend appointments potentially increase the likelihood of their receiving treatment of ocular conditions before disease becomes severe.

10.17 Ethnicity and Referral Appointment Attended or Completed-Subsequent Study

There was no clear association between ethnicity and referral appointments attended by patients. The ethnic distribution of attendance at the referral appointment did not show an increased likelihood of attendance by any one ethnicity. This finding has its potential limitations, as cultural factors influencing patient decision-making were not tested within this study. Patients may make decisions regarding attendance to appointments by cultural and ethnic traditions.
10.18 Clinic of Initial Examination and Attendance to Referral Appointment-Subsequent Study

There were no clear associations between clinics of initial examination and attendance to the referral appointment.

10.19 Type of Specialist to whom Patient is Referred and Attending the Referral Appointment-Subsequent Study

There were no clear associations between specialist to whom patient is referred and attendance to the referral appointment.

10.20 Patient Interviews and Attendance to the Referral Appointment

Patient interviews did not reveal a clear association between patient positive perceptions of optometrist’s communication and attendance to the referral appointment. Optometrists’ communication regarding urgency and importance of attending the referral appointment did not reveal a clear association with attendance to the referral appointment and patient’s perception of financial and transportation constraints did not show a significant association with referral attendance. This association was most likely due to the reduced enrollment of subjects within patient interviews, thirty-one patients were enrolled into interviews. Reduced enrollment was due to patient inaccessibility via telephone contact. Patients were called at various times of the day, and several times of the week and weekend. In addition patients were contacted at least two times to increase
enrollment. Though a majority of patients contacted were open to participating within the study, willingness was not uniform throughout subjects.

10.21 Potential limitations, Subsequent Study

This study was initiated with the goal of enrolling 100 subjects in the study. The hope was to obtain a clinically meaningful result and a statistically significant result. This study’s results pose a limitation that should be considered prior to the acceptance of the results. Within this study 79 subjects were enrolled not 100 subjects. This study has 49 subjects enrolled that had letter only communications utilized for their referral, while letter and phone communications has 29. The goal was to enroll 55 patients for whom “Letter Only” communications are utilized, and 35 patients for whom “Letter and Phone Call “combination referrals were utilized. This could reduce our ability to achieve a clinically meaningful result even if we received a statistically significant result. In order to meet a clinical meaningful difference the percentage difference between methods would be 50% increase in attendance to referral appointments.

In this study a statistically significant difference was achieved but a clinically meaningful difference was not achieved, because only a 21.72% difference in attendance was created. Nonetheless this result encourages further targeted study to determine if a clinically meaningful difference could be found, that might warrant a change in referral communications.

Another limitation present within this study is that the restriction of the querying method within the EHR system utilized by OSUCO. The querying method used to

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retrieve records that were associated with a referral letter sent out by the doctor, were queried on “Letter dr out”. Current OSUCO clinical standard of care entails drafting a referral letter to send to the specialist. The limitation from this querying method was revealed when it was found that in that referral letters are not the only letters that are captured by this query. Doctors within the OSUCO clinics write letters for their patients for various reasons, such as examination reviews, letters to third party insurance payers and disability determination reports. Within the query initiated for this study, all of these different types of letters were obtained in the 200 letters reviewed to obtain the sample of 100 subjects, not just referral letters. This reduced the number of referral subjects that could be enrolled into the study because of the Institutional Review Board restriction to a limit of 200 reviewed records.

Another limitation dealt with irregular provider documentation within medical records. Documentation can differ between records due to provider and clinic variations in recording of medical data. These differences posed a challenge in collecting all needed data to truly assess true referral patterns. EHR were introduced to the OSUCO computer system in 2011. With every new technological implementation there are learning curves that each new provider, student and clinic must pass through. Due to these learning curves documentation of referral details was not always consistent throughout each medical record. Placement of details within the medical record varied, making electronic tracking of pertinent data difficult.

Certainty of data availability was also a concern. A provider may have initiated a phone call and sent a letter to the specialist to complete the referral but may not have
recorded this within the medical record. If it was recorded it may have been found in several different locations within the EHR. This would have required a search of the entire medical record to ensure that all referral data was recovered for this study. This variation in recording and documentation may have reduced the ability to assess associations between various factors and the outcome measure of attendance at the referral appointment.
Chapter 11 Conclusion—Subsequent Study

In this study, it is clear that there is a statistically significant correlation between “Letter and Phone Call” referral communication methods and attendance to the referral appointment. This statistically significant correlation however, is not equivalent to a clinically meaningful difference between referral communication methods. This result can promote further research that can utilize a sample size that is large enough to illicit a clinically meaningful difference.

A summary of the findings of this study are:

1. “Letter and Phone Call” referral communications had a statistically significant association with an increased attendance to referral appointments. This result however was not clinically meaningful but does promote further research.

2. “Letter and Phone Call” combination referral communication method had an increased likelihood that a referral appointment would be scheduled.

3. There was a decrease in scheduling with “Letter Only” referral communications

4. There was a decrease in scheduling the referral appointment for Caucasian patents.

5. “Letter Only” referrals were more likely to be used with Caucasians.
6. Binocular Vision and Low Vision Clinics were more likely to be referred using the Letter Only referral communications.

7. The predominant referred demographic are Caucasian and the second most common referred demographic are African Americans patients.

8. Most patients are referred from the Primary Vision Care Clinic than all other OSUCO clinics.

9. The most prevalent ocular or systemic conditions sent for referral in the OSUCO clinic system are cataract and glaucoma.

10. There is no clear relationship between patients financial and transportation constraints from this study. Future study with larger sample sizes should be conducted so that considerations can be given to a patients’ ability to find transportation to referral appointments. This is a social determinant of health that is unfortunately often overlooked by those in the health care professions.

11. There is no direct relationship between patients perception of the optometrist explanation of the diagnosis, explanation of the importance of attending the referral, explanation that further evaluation is necessary, or perceived urgency to attend the referral appointment.

12. There is no direct relationship between patients’ perception of the effectiveness of communication methods utilized within the referral. Telephone, Written, and Electronic communications did not reveal a significant relationship between communication method and attendance to referral appointment.
<table>
<thead>
<tr>
<th>Patient Interview - Subsequent Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The optometrist explained the diagnosis in a clear manner?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>2. The optometrist explained the importance of attending the referral appointment?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>3. The optometrist explained that further evaluation and treatment is necessary?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>4. The optometrist office used telephone communication with the specialty provider to schedule my referral appointment?</td>
</tr>
<tr>
<td>i. Yes or No or I don’t know</td>
</tr>
<tr>
<td>5. The optometrist office used electronic communication to remind me of my upcoming referral appointment?</td>
</tr>
<tr>
<td>i. Yes or No or I don’t know</td>
</tr>
<tr>
<td>6. The optometrist office used written communication to remind me of my upcoming referral appointment?</td>
</tr>
<tr>
<td>i. Yes or No or I don’t know</td>
</tr>
<tr>
<td>The following questions will be used with patients that received each communication method respectively.</td>
</tr>
<tr>
<td>7. I found the electronic communication effective in confirming my referral appointment?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>8. I found the phone communication effective in confirming my referral appointment?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>9. I found the written communication effective in confirming my referral appointment?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>10. I had difficulty attending the referral appointment due to financial constraints?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>11. I had difficulty attending the referral appointment due to transportation constraints?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
<tr>
<td>12. I perceived that it was urgent or important that I attend the referral</td>
</tr>
<tr>
<td>appointment?</td>
</tr>
<tr>
<td>i. Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree</td>
</tr>
</tbody>
</table>

Table 1 Patient Interview - Subsequent Study
Patient Ethnicity | Total patients Referred to a specialist in this Ethnicity | Total patients that Scheduled in this ethnicity | Total patients that Attended their appointment in this Ethnicity | Percent of Attendance as compared to patients referred in this ethnicity | Percent of Attendance as compared to overall Attendance
---|---|---|---|---|---
Caucasian | 56 | 27 | 18 | 32.14 | 66.67
African American | 14 | 9 | 6 | 42.86 | 22.22
Asian | 3 | 3 | 1 | 33.33 | 3.70
Hispanic | 2 | 1 | 0 | 0.00 | 0
Somali | 1 | 1 | 1 | 100.00 | 3.70
Declined to answer | 2 | 2 | 1 | 50.00 | 3.70
Total | 78* | 43 | 27 | 34.61

*Patient total is reduced to 78 due to exclusion of the one Phone Call only referral (to the ER department)

Table 2 Associations of Patient Ethnicity and Referrals Scheduled and Attended
Table 3 Associations of Scheduling and Attendance with Specialist

<table>
<thead>
<tr>
<th>Specialist Provider</th>
<th>Total patients Referred to this Specialist</th>
<th>Total patients Scheduled with specialist</th>
<th>Total patients that Attended their appointment</th>
<th>Percent of Attendance compared to patients referred to each Specialist</th>
<th>Percent of specialist attendance compared to overall attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binocular Vision Specialist</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Glaucoma Specialist</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>50.00</td>
<td>3.7</td>
</tr>
<tr>
<td>Neuro-Ophthalmologist</td>
<td>9</td>
<td>5</td>
<td>4</td>
<td>44.44</td>
<td>14.8</td>
</tr>
<tr>
<td>Neurologist</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>General Ophthalmologist</td>
<td>50</td>
<td>32</td>
<td>22</td>
<td>44.00</td>
<td>81.5</td>
</tr>
<tr>
<td>Emergency Room Physician</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Primary Care Physician</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Retinal Specialist</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>78*</td>
<td>43</td>
<td>27</td>
<td>34.61</td>
<td></td>
</tr>
</tbody>
</table>

*Patient total is reduced to 78 due to exclusion of the one Phone Call only referral (to the ER department)
<table>
<thead>
<tr>
<th>Clinic of Initial Eye Examination</th>
<th>Total patients Referred From Clinic</th>
<th>Total patients Schedule d from clinic</th>
<th>Total patients Attend ed from this Clinic</th>
<th>Percentag e of Attendance compared to Referred from this clinic</th>
<th>Percentage of Attendance compared to overall Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Vision Care Clinic</td>
<td>35</td>
<td>20</td>
<td>10</td>
<td>28.57</td>
<td>37.04</td>
</tr>
<tr>
<td>Low Vision Clinic</td>
<td>17</td>
<td>7</td>
<td>5</td>
<td>29.41</td>
<td>18.52</td>
</tr>
<tr>
<td>Binocular Vision Care Clinic</td>
<td>14</td>
<td>6</td>
<td>5</td>
<td>35.71</td>
<td>18.52</td>
</tr>
<tr>
<td>Advance Ocular Care Clinic</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>62.5</td>
<td>18.52</td>
</tr>
<tr>
<td>Contact Lens Clinic</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>33.33</td>
<td>3.70</td>
</tr>
<tr>
<td>Traumatic Brain Injury Clinic</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>100.00</td>
<td>3.70</td>
</tr>
<tr>
<td>Total</td>
<td>78*</td>
<td>43</td>
<td>27</td>
<td>34.61</td>
<td></td>
</tr>
</tbody>
</table>

*Patient total is reduced to 78 due to exclusion of the one Phone Call only

Referral (to the ER department)

**Table 4** Associations of Clinic of Initial Examination Scheduled and Attendance
<table>
<thead>
<tr>
<th>Referral Communication Methods</th>
<th>Total Referrals with this Communication Method</th>
<th>Total Referrals Scheduled with this Communication Method</th>
<th>Total Referrals Attended with this Communication Method</th>
<th>Percent of Referrals Attended compared total Referred</th>
<th>Percent Referrals compare d to overall Attendan ce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter and Phone Call Communicatio n Method</td>
<td>29</td>
<td>27</td>
<td>14</td>
<td>48.28</td>
<td>51.85</td>
</tr>
<tr>
<td>Letter Only Communicatio n Method</td>
<td>49</td>
<td>16</td>
<td>13</td>
<td>26.53</td>
<td>48.14</td>
</tr>
<tr>
<td>Total</td>
<td>78*</td>
<td>43</td>
<td>27</td>
<td>34.61</td>
<td></td>
</tr>
</tbody>
</table>

*Patient total is reduced to 78 due to exclusion of the one Phone Call only Referral (to the ER department)

**Table 5 Associations of Scheduling, Attendance, and Referral Communication Method**
References


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U.S. Department of Health and Human Services, Administration on Aging, 2013, A profile of older Americans