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## Barriers to initiation and continuation of vision care among diabetics

Jennifer Eilleen Werner

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BARRIERS TO INITIATION AND  
CONTINUATION OF VISION CARE AMONG DIABETICS

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A Thesis  
Presented to the  
Faculty of  
California State University,  
San Bernardino

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science  
in  
Health Services Administration

---

by  
Jennifer Eilleen Werner

December 2002

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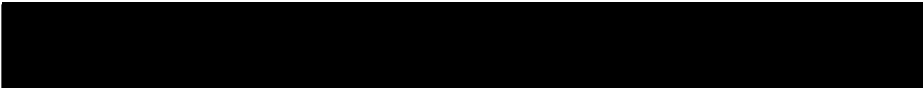
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by  
Jennifer Eilleen Werner  
December 2002

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Nov. 12, 2002  
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Daniel Fahey, Ph.D.

  
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## ABSTRACT

This thesis explores the barriers to initiation and continuation of vision care among diabetics. There are several indicators and issues that evolve from barriers pertaining to initiation and continuation of vision care among diabetics. Person's who are aware of their diabetes may fail to seek treatment for specific eye diseases affiliated with diabetes. With proper eye care, many cases of diabetes related legal blindness could be prevented. Persons who have been diagnosed with diabetes may fail to utilize their medical access or receive treatment for their disease. Failure to use effectively available care can be due to lack of education, communication, or knowledge of the disease.

Diabetes Mellitus is a disease in which the body does not produce or properly use insulin, a hormone that is needed to convert sugar, starches and other food into energy needed for daily life. There are 15.7 million people or 5.9% of the population in the United States who have diabetes (American Diabetes Association, 2001). Each day approximately 2,200 people are diagnosed with diabetes, about 798,000 people each year (American Diabetes Association, 2001). Diabetes is the leading cause of new cases of blindness in people ages 20-74. Each year,

12,000 to 24,000 people lose their sight because of diabetes (American Diabetes Association, 2001).

Previous research found that the barriers to vision care were determined to be a lack of the persons understanding of diabetes self-management, a resistance to make the lifestyle changes necessary to cope with the disease and poor coordination of care between hospitals, specialists, and the person's primary care physician (PCP).

This study uses the data from the 1999 National Health Interview Survey (NHIS). The NHIS administers telephone interviews in a nationally representative random sample of U.S. households. Information is obtained about the health and other characteristics of each member of the household.

The 1999 NHIS contained 38,633 households, with 100,618 persons in 39,264 families. The interview sample for the Sample Adult component, which required self-responses to all questions was 32,374 persons 18 years of age and older. The interview sample for the Sample Child component, by proxy response from knowledgeable adults in the family was 13,376 children 0-17 years old.

The sampled responses were analyzed by whether the respondent (having been diagnosed with diabetes) had a barrier to their initiation or continuation of their vision care (i.e. cost, transportation, insurance, etc.).

The overall findings of the NHIS data set conclude that those diagnosed with diabetes are older than the population as a whole (persons aged 5-60 years of age constitute 23.5 percent of those diagnosed with diabetes, but 13.7 percent of the total population). Those surveyed consisted of 47 percent males and 52 percent females.

The majority of the data set findings also conclude that those who have been recently diagnosed with diabetes tend to seek out vision care within 12 months of their diabetes; compared to those who have been previously diagnosed with diabetes.

## ACKNOWLEDGMENTS

My sincere thanks and gratitude to my husband James, without you my goal of earning my Masters Degree would have never been achieved. Thank you very much for all of your support, understanding and patience while I attended school. You are my rock!

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A big thank you to Ms. Nan Shapiro for her constant words of encouragement and support while I was in the process of earning my Masters Degree. I would also like to thank her for being a part of my committee and for taking the time to review my thesis. It is because of you Nan, that I have accomplished many of my educational goals - thanks!

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CHAPTER ONE  
INTRODUCTION AND DEVELOPMENT  
OF PROBLEM FOR RESEARCH

The Burden of Diabetes

Seventeen million Americans have diabetes, and over 200,000 people die each year of related complications (CDC, 2002b). Diagnosed diabetes increased 49% from 1990 to 2000 among United States Adults (CDC, 2002b). Per Dr. Jeffrey P. Koplan, MD, MPH Director, Centers for Disease Control and Prevention from 1998-2002, "Dramatic new evidence signals the unfolding of a diabetes epidemic in the United States. With obesity on the rise, we can expect the sharp increase in diabetes rates to continue. Unless theses dangerous trends are halted, the impact on our nation's health and medical care costs will be overwhelming."

Diabetes is now the sixth leading cause of death in America; diabetes has its greatest effects on the elderly population and certain racial and ethnic groups. On average, one in five adults over the age of 65 have diabetes. Among adults of age 20 or older, African Americans are twice as likely as Caucasians to have

diabetes, and American Indians and Alaska Natives are 2.6 times more likely to have diabetes (CDC, 2002b).

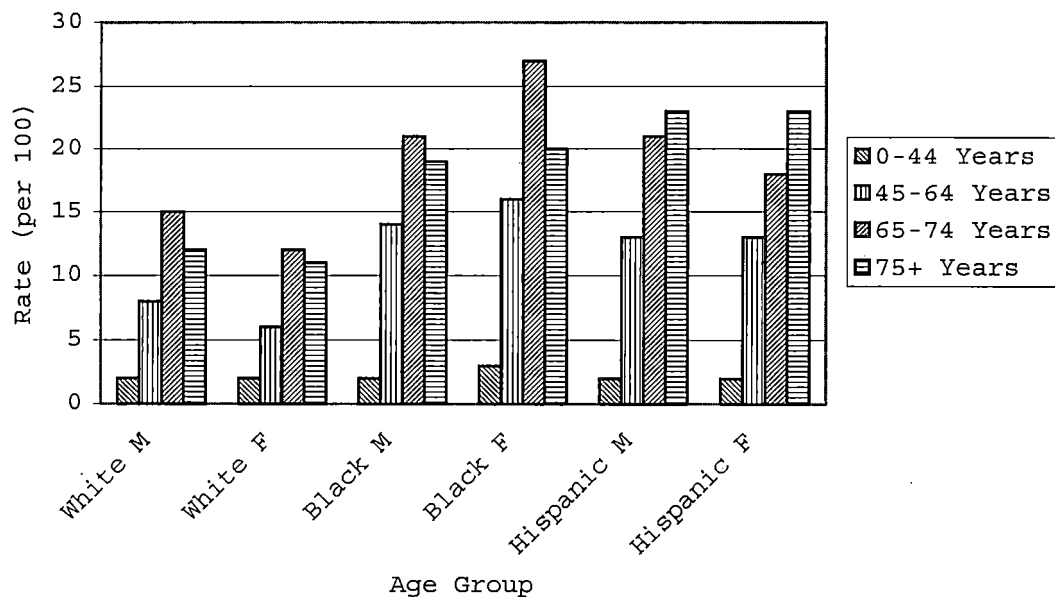
It has been reported that diabetes has consistently been among the top four primary diagnoses for adults. Diabetic patients utilize more than twice the outpatient services compared to other non-diabetic patients. Further, the Hispanic population is noticeably accessing eye care services as often as other non-Hispanic populations.

In 1997-1999, those diagnosed with diabetes was higher in each age group for blacks and Hispanics than for whites (CDC, 2002b). Black women had the highest prevalence among those aged less than 75 years and Hispanic men and women had the highest prevalence among those aged 75 years and older (CDC, 2002b). See Figure 1 for further details.

Per the CDC, diabetes is becoming more common in the United States. In 1999 alone, about 11.1 million persons in the United States reported that they had diabetes (CDC, 2002b). Between 1996 and 1997 there was a large increase in the number of people with diagnosed diabetes (CDC, 2002b). See Figure 2 for further details.

Persons with diabetes suffer from the most common chronic health conditions, such as Cardiovascular Diseases (57.2%), Arthritis (21.4%), Eye Disorders (19.9%) and

Mental Illness [13.5%] (Partnership for Solutions, 2002). The cost of such chronic conditions to health care expenses is also extremely high, for example, the per capita health care expense for diabetes and eye disorder is around \$6,987 (Partnership for Solutions, 2002).



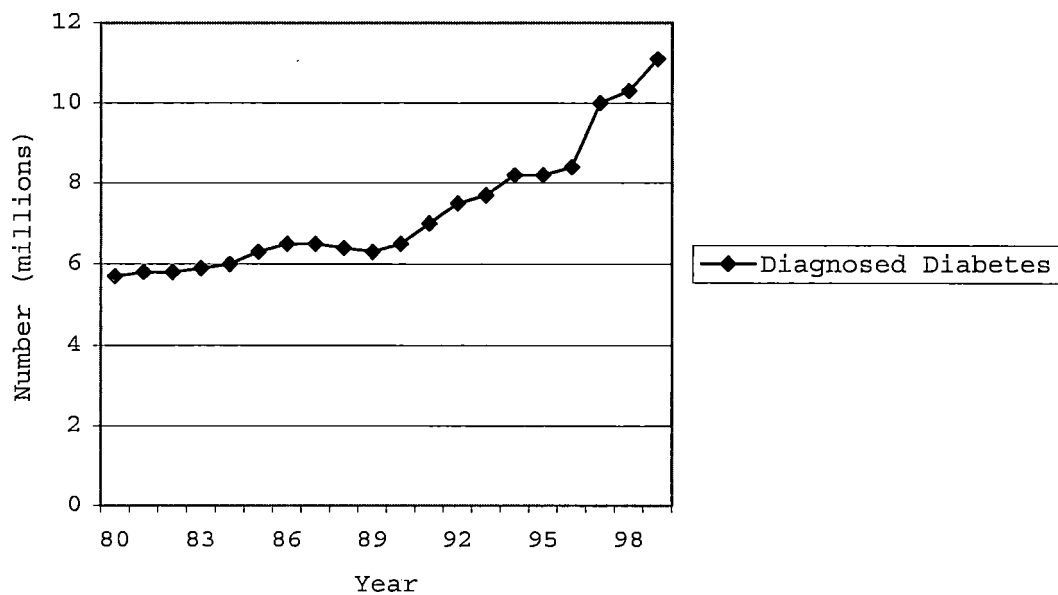
1999 (CDC's Diabetes Program - Diabetes Surveillance System, 2002)

Figure 1. Age-Specific Prevalence of Diagnosed Diabetes, by Race/Ethnicity and Sex, United States

People with diabetes and other chronic conditions that occur from the diabetes use more health care services. The direct and indirect costs of diabetes are nearly \$100 billion a year (CDC, 2002b). Increased use of these health care services and medications has substantial



implications for coordination of care and patient outcomes (Partnership for Solutions, 2002). For example, people with diabetes who have other chronic conditions tend to visit physicians more often (see Figure 4). The average cost of health care for a person with diabetes in 1997 was \$10,071, compared with \$2,699 for a person without diabetes (CDC, 2002b).

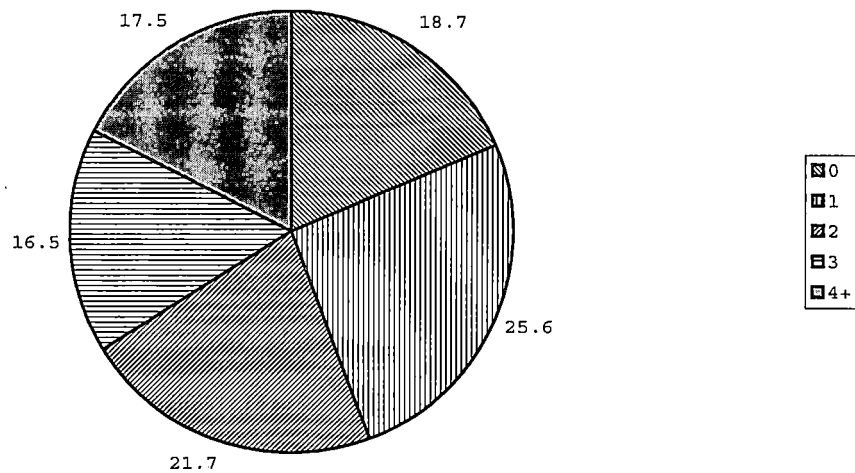


(CDC's Diabetes Program - Diabetes Surveillance System 2002)

Figure 2. Number Per Million of Persons with Diagnosed Diabetes, United States, 1980-1999

## Diabetes and Blindness

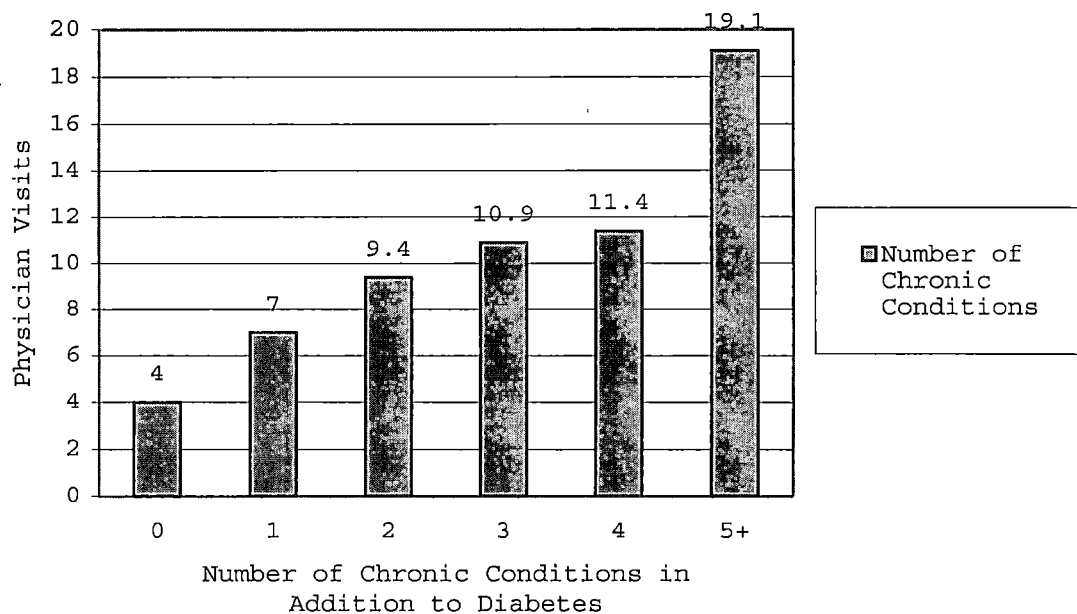
Each year, 12,000-24,000 people become blind because of diabetic eye disease. Screening and care could prevent up to 90% of diabetes related blindness; yet, only 60% of people with diabetes receive annual dilated eye exams (CDC, 2002b).



\*Number of Chronic Conditions in Addition to Diabetes (0-4+)

Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 1996. (Diabetes: The Impact of Multiple Chronic Conditions, 2002)

Figure 3. Percent of People with Diabetes and Other Chronic Conditions



Source: Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 1996 (Diabetes: The Impact of Multiple Chronic Conditions, 2002)

Figure 4. Average Annual Number of Physician Visits by Number of Chronic Conditions

### Diabetic Retinopathy

The most common eye disease in persons with diabetes is diabetic retinopathy (Methods Health Care System, 2002). Approximately 80% of blindness in the age group of 20-74 is related to diabetic retinopathy [at least 50,000 Americans are legally blind from this condition] (Alexander, Blume, Cavallerano, Den Beste, Pederson, & Walls, 1998). Diabetic retinopathy can be described as a progressive deterioration in the microcirculation to the

retina observed in patients with diabetes mellitus (Stein, 1990). After approximately fifteen years of poorly controlled diabetes mellitus, micro aneurysms are present in at least 50% of diabetic patients (Stein, 1990).

Diabetic retinopathy is a highly specific vascular complication of both Type 1 and Type 2 diabetes. The longer a person has diabetes, the more likely he or she will develop diabetic retinopathy. After 20 years of diabetes, nearly all patients with Type 1 diabetes and 60% of patients with Type 2 diabetes have some degree of retinopathy (Aiello, Blankenship, Cavallerano, Ferris II, Gardner, King, & Klein, 1998). Vision-threatening retinopathy virtually never appears in Type 1 patients in the first 3-5 years of diabetes or before puberty. This is why continuous annual eye examinations become so important for the diabetic.

Two of the classic complications of diabetic retinopathy involve proliferation of endothelial cells and increased retinal vascular permeability (Aiello et al., 1998). Proliferative diabetic retinopathy (PDR) is a vision-threatening micro vascular complication of diabetes in which new vessels grow on the surface of the retina and into the vitreous body (Kogure, Kondo, Nakamura, Sakane, Takakura, Umekawa, Yoshida, & Yoshioka, 1997). Other risk

factors associated with diabetic retinopathy include glycemic control hypertension and hyperlipidemia (Kogure et al., 1997). If abnormal blood vessels associated with PDR bleed, vision may become spotty, hazy, or disappear completely (American Academy of Ophthalmology, 1995). Another category of diabetic retinopathy, in its early form of the disease, is non-proliferative diabetic retinopathy [NDR] (Methods Health Care System, 2002). NDR is characterized by retinal, intra-retinal hemorrhages, hard exudates and soft exudates. If non-proliferative or background retinopathy leads to macular edema (the collection of intra-retinal fluid in the macular area of the retina), a person may notice a gradual blurring of vision, and may have difficulty doing close work such as reading (American Academy of Ophthalmology, 2002).

Vision loss due to diabetic retinopathy results from several mechanisms. First, central vision may be impaired by macular edema or capillary no perfusion. Second, the new blood vessels of PDR and contraction of the accompanying fibrous tissue can distort the retina and lead to traditional retinal detachment, producing severe and often irreversible vision loss. Third, the new blood vessels may bleed, adding the further complication of preretinal or vitreous hemorrhage (Aiello et al., 1998).

Changes in a diabetic's retina may include symptoms such as blurred or fluctuating vision, floating spots, distortion, warping of straight lines, or loss of vision (Levin 1998). Distortion of straight lines can be a serious symptom, which is often a sign of macular edema. Many patients first notice a distortion while observing tiles or floor patterns with one eye closed. Floating spots may be the result of age-related changes, but they also indicate vitreous hemorrhage (Levin & Pfeifer, 1998).



Normal Vision



Vision with Diabetic Retinopathy

(National Eye Institute, 2002)

Figure 5. Seeing Through the Eyes of a Person with Diabetic Retinopathy

#### Delays in Initiation

There are usually no symptoms or pain in the early stages of the diabetic retinopathy, and vision may not change until the disease progresses (Methods Health Care

System, 2002). One major reason people with this disease do not seek medical care or treatment in the early stages of the disease is that they simply do not feel the need to seek treatment nor do they feel they are at risk for the disease because of the lack of symptoms. As an illustration to this point of view, while an estimated 10.3 million people have been diagnosed with diabetes, unfortunately, only 5.4 million people are not aware that they even have the disease, therefore, are not receiving the proper care they need (American Diabetes Association, 2001).

Approximately 26% of patients with Type 1 diabetes and 36% with Type 2 diabetes have never had their eyes examined (Methods Health Care System, 2002). These patients tend to be older, less educated, and more recently diagnosed than those receiving regular eye care. They also are likely to live in rural areas and receive their health care from a family or general practitioner. When finally examined, almost 61% of these patients exhibit diabetic retinopathy (Methods Health Care System, 2002).

Overall, since diabetic retinopathy and other eye diseases may be developing even when sight is good, regular eye exams are important for finding problems with

vision in the early stages of the disease. Even if sight has been lost from a diabetic eye disease, a regular eye examination is always needed on an annual basis.

#### Problem for Research

Barriers to initiation and continuation of vision care may prevent persons diagnosed with diabetes from receiving their annual diabetic eye exam. Persons diagnosed with diabetes should receive an annual eye exam to rule out possible eye diseases or vision loss that relate to diabetes (American Diabetes Association, 2001). Although persons diagnosed with diabetes are informed of related eye problems that can affect them due to their illness, there is the possibility that they will not visit an eye specialist, to receive an annual eye exam.

Type 1 or Type 2 diabetes can develop diabetic eye diseases, which can cause severe vision loss or even blindness. Per the American Diabetes Association, each year, 12,000 - 14,000 people lose their sight because of diabetes. With proper eye care, many cases of diabetes related legal blindness could be prevented.

The problem for research here is to identify the kinds of barriers to initiation and continuation encountered by those who have been diagnosed with



diabetes. Specifically, what factors are associated with persons who, despite having been diagnosed with diabetes, fail to seek an initial consultation within one year of diagnoses or who fail to comply with the recommendation of an annual examination?

## CHAPTER TWO

### LITERATURE REVIEW

#### Description of Type 1 and Type 2 Diabetes

There are two forms of diabetes, Type 1 and Type 2. Type 1 diabetes is an auto-immune disease in which the body does not produce any insulin, occurring most often in children and young adults. Type 1 diabetes accounts for 5-10 percent of persons diagnosed with diabetes (American Diabetes Association, 2001). Type 2 diabetes is a metabolic disorder resulting from the body's inability to make enough, or properly use, insulin. It is the most common form of the disease and accounts for 90-95 percent of person's diagnosed with diabetes (American Diabetes Association, 2001). Diabetics of either Type 1 or Type 2 diabetes can develop diabetic eye diseases, which can cause sever vision loss or even blindness.

Patients with Type 1 diabetes between 12-30 years of age should have their eyes examined after 5 years duration of the disease (Alexander et al., 1998). Vision screening for diabetic retinopathy is generally not indicated before puberty (Alexander et al., 1998). Follow up examinations should be performed annually or as indicated by the clinical findings. Patients with Type 2 diabetes should

have an eye examination at the time of the initial diagnosis as well as follow up examinations performed annually (Alexander et al., 1998).

#### Reported Rates of Diabetic Eye Examinations

Diabetics who seek eye exams should have a complete comprehensive eye exam performed by their optometrist or ophthalmologist. A comprehensive eye exam includes visual field tests, glaucoma testing and a refraction test. The exam will also include a dilation of the patient's eye. By dilating the eye during the examination the provider is able to diagnose and recommend treatment if diabetic retinopathy is discovered.

NCQA's (National Committee for Quality Assurance) fourth annual report, revealed that 45.3% of managed care enrollees with diabetes underwent a comprehensive eye exam in 1999 (this was up from 38% in 1996) (The American Optometric Association News, 2000). This indicates improvement of diabetic patients seeking eye exams and or treatment for any eye disease that may occur through diabetes. Diabetes-related eye examinations are one of a half-dozen "fundamental preventive care" measures taken up by HMOs (The American Optometric Association News, 2000).

Based on the 1999 National Health Interview Survey, those persons sampled (30,801), between the ages of 1-84 years old, 25% (1,217) received their annual eye examination within 1-12 months after being diagnosed with diabetes. Of those also sampled during this survey, 12% of those sampled that were diagnosed with diabetes received their eye examination in less than one month after diagnoses. All in all, less than 1% actually responded to the survey questions regarding their health and issues dealing with diabetes.

With proper eye care, 1,937 cases of diabetes related legal blindness each year could be prevented (The American Optometric Association News, 2000). Through the fourth annual report by NCQA it was noted that the percentage of managed care patients receiving comprehensive eye examinations varies from 28% to 66% depending on the plan or region (The American Optometric Association News, 2000).

Figure 6 portrays the percentage of patients using the three basic services considered essential to diabetes care - diabetes education, diet counseling, and retinopathy screening by an Ophthalmologist.

NIDDM = non-insulin-dependent diabetes mellitus (Hiss, 1996)

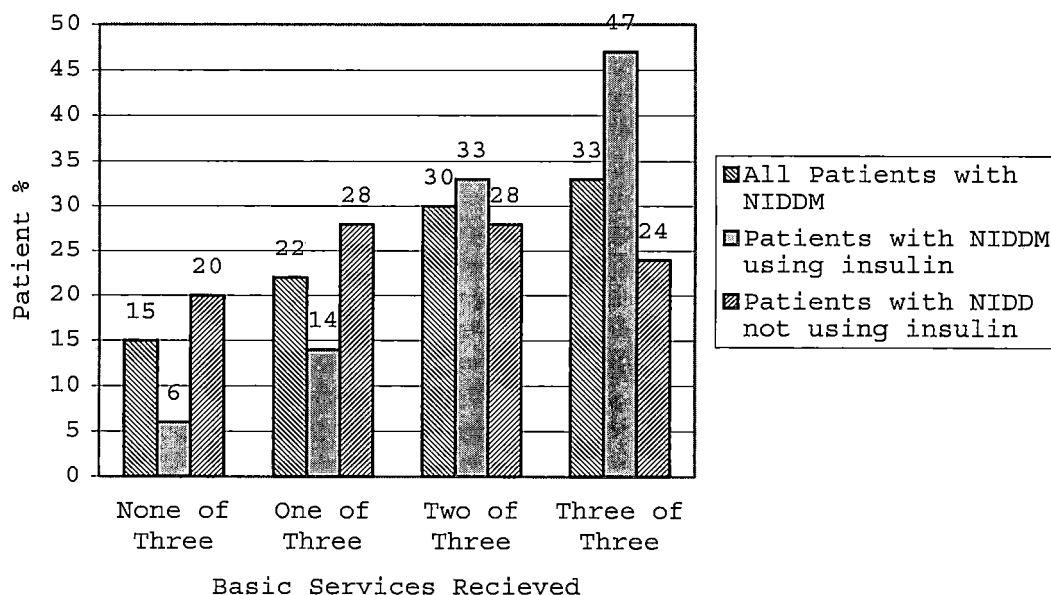


Figure 6. Basic Diabetic Services Received

### Identified Barriers to Vision Care Among Diabetics

#### Access

Access to healthcare remains one of the continuing problems for approximately 43 million Americans who either have no medical insurance or who are medically underserved (Chin, Chiu, Cook, Drum, Harrand, Harrison, Jin, Koppert, Schaefer, Takashima, & Thiel, 2001). Providers who work or are involved in health centers indicate the need for a better health care delivery systems and reforms that improve the affordability, accessibility, and efficiency of care (Chin et al., 2001). According to a survey reported in "Barriers to Providing Diabetes Care in

Community Health Centers", 51% of providers (primary care providers) surveyed agreed that patients could not afford a dilated eye exam (Chin et al., 2001). Within that same survey, 25% of the providers (primary care providers) surveyed agreed that they sometimes forget to order eye exams for diabetic members.

### Education and Healthcare Knowledge

Education of the patient is an essential factor in dealing with diabetes. A team of physicians, nurses, pharmacists, dietitians and health educators are all included in the care and education of the diabetic member (Chin et al., 2001). Most community-based patients with non-insulin-dependent diabetes mellitus (NIDDM) are not aggressively managed because of attitudinal, educational, and systemic factors that act as barriers to optimal health care delivery (Hiss, 1996).

### Provider Factors

Barriers that conflict with provider care are time constraints as far as seeing the member on a continuous basis and the length of time the provider spends with the member during their visit (Chin et al., 2001). A standard physician office visit for a patient with uncomplicated NIDDM is billed (to either the patient or the insurance) as a "routine" primary care encounter, not as a diabetic

exam; therefore, data collected is misinterpreted (Hiss, 1996). An average length of time for a routine visit is 12 to 15 minutes (Hiss, 1996), clearly not enough time to spend educating a diabetic member or meeting their needs for standard treatment. Patients with NIDDM normally receive 45 to 60 minutes of physician care per year, not at all sufficient time for the complex, multisystemic, and multidimensional disease that diabetes is (Hiss, 1996).

Per Dr. Hiss, the main barriers to optimal care of community-based patients with NIDDM are that: 1) NIDDM is not considered or managed as a serious problem by most physicians and their patients; 2) the genetic basis for and refractory nature of obesity are not generally appreciated; and 3) as a complex, multisystemic chronic illness, diabetes fits poorly in a health care delivery system designed to deal with acute and episodic illnesses (Hiss, 1996).

#### Cultural and Linguistic Barriers

Language and cultural differences may also serve as a barrier to vision care among diabetics. It has been noted that providers in urban health centers were more likely to report language and cultural barriers between themselves and the members they treat compared to other healthcare settings (Chin et al., 2001).

Ineffective communication has been identified as another barrier to effective treatment of diabetes (Freeman, 2000). Different interpretations of medical terms, differences between the clinician's personal feelings and professional ideas conveyed to the patient, and discrepancies between what the clinician emphasizes and what the patient thinks is important can obstruct effective communication and successful management of the disease (Freeman, 2000).

#### Patient Access

Having access to health care services can significantly influence health care use and healthy outcomes. Limitations in access to care extend beyond such simple issues as a shortage of health care providers or facilities in some areas (Children's Health, 1996). Even where health care services are readily available, people may not have a usual source of health care or may experience barriers to receiving services because of financial or insurance restrictions, a lack of availability of providers at night or weekends, or other difficulties such as transportation (Children's Health, 1996).



### Having a Usual Source of Care

Persons with a usual source of health care have been shown to be more likely to receive a variety of preventive health services than those without a usual source of care (Children's Health, 1996). Hispanic and African-American children were less likely than Caucasian children to have a usual source of care and less likely to have an office-based usual source of care (Children's Health, 1996).

### Financial Barriers to Access

Approximately 12.8 million families (11.6% of all American families) experienced difficulty or delay in obtaining care, or did not receive needed health care services (Children's Health, 1996). Among these families, inability to afford their health care was noted by the majority (59.9%) as the main problem (Children's Health, 1996).

### Concluding Statement

Diabetes is a model illness for improving chronic disease management. Information is the key for persons with diabetes to seek treatment on an annual basis. The more knowledge given to diabetics about retinopathy, the better understanding of the disease, its symptoms and the

risks involved may cause them to seek help early enough to help prevent the disease from progressing. Although diabetic retinopathy is not totally preventable or curable, many cases of blindness can be avoided due to advances in the management of diabetes and diabetic retinopathy (Alexander et al., 1998).

Early diagnosis, intensive treatment, and long-term, consistent follow up evaluations for diabetic patients are essential for effective treatment, which can significantly lower the risk of blindness. Intensive treatment to maintain blood glucose concentrations close to the normal range have been shown to decrease the risk of development of diabetic retinopathy by 76% (Alexander et al., 1998).

Optometrists, through their clinical education, training, experience, and broad geographic distribution, have the means to provide primary eye and vision care for a significant portion of the American public and are often the first health care practitioners to examine patients with undiagnosed diabetes mellitus or ocular manifestations of diabetes mellitus (Alexander et al., 1998). Early referral for eye care and prompt and appropriate intervention lessen the risk for and the severity of vision loss related to diabetes. Early referral is crucial for African Americans and Hispanic

patients [37.3% of African Americans and 42.9% of Hispanic patients have significant diabetic retinopathy at the initial diagnosis of diabetes mellitus] (Alexander et al., 1998).

Based on the Patterns of Adherence to Diabetes Vision Care Guidelines, it was found that non-adherence to the guidelines at baseline was defined as the absence of a dilated eye examination during the year before recruitment into the study. Of the 2,308 persons interviewed, 813 (35%) did not follow the vision care guidelines; two thirds of this group reported no eye examination in the year before the interview and one third had an undilated examination.

Several barriers have been identified regarding the initiation and continuation of vision care among diabetics. These include weight of the person (mainly those who are obese), access to health care (those who are uninsured or underinsured), communication (between provider and their patients), language (different speaking capabilities), affordability (able to afford vision care), education (knowledge of diabetes and it's effects) and provider barriers (based on length of time for treatment spent with members during a visit).

The objective of this thesis is to identify the barriers to initiation and continuation of vision care among diabetics.

## CHAPTER THREE

### METHODS

#### The 1999 National Health Interview Survey

##### Overview of Design-Sources of Data

The data used for analysis of barriers to initiation and continuation of diabetic eye care were from the 1999 National Health Information Survey. The National Health Interview Survey (NHIS) is a multi-purpose survey conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), and is the principal source of information on the health of the civilian, non-institutionalized, household population of the United States. The National Health Interview Survey (NHIS) is conducted annually since its beginning in 1957.

##### Participants

Registration (for participant in the study) was done by the 1999 National Health Information Survey (NHIS). The interviewed sample for 1999 consisted of 38,633 households, which yielded 100,618 persons in 39,264 families. The interview sample for the Sample Adult component, which required self-response to all questions, was 32,374 persons 18 years of age and older. The

interviewed sample for the Sample Child component, by proxy response from knowledgeable adult in the family, was 13,376 children 0-17 years old.

#### Content of the National Health Interview Survey Household Questionnaire

The U.S. Bureau of the Census conducts NHIS data collection under an interagency agreement with NCHS. NHIS interviewers are employees of the U.S. Bureau of the Census. These interviewers receive extensive training, and their work is monitored through a quality assurance program. Data are collected from each family in the survey sample using a face-to-face interview. If a sampled household contains more than one family, many aspects of the interview are repeated for each family in the household (Botman, Moore, Moriarity, & Parsons, 2002).

The basic module contains three components: the family core, the sample adult core, and the sample child core. The family core component collects information on everyone in the family. Information collected in the family core component includes household composition and socio-demographic characteristics. It also includes basic indicators of health status and utilization of health care services. From each family in the survey, one sample adult and one sample child (if any children under age 18

are present) are randomly selected, and information on each is collected with the sample adult core and the sample child core questionnaires (Botman et al., 2002).

### Sample Design

The NHIS is conducted annually by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). The 1999 NHIS is broken into seven questionnaires - Household, Family, Sample Adult, Sample Child, Immunization, Recontact, and Cancer Control.

Each week a probability sample of the civilian non-institutionalized population of the United States is interviewed by personnel of the U.S. Bureau of the Census. Information is obtained about the health and other characteristics of each member of the household.

The Survey is based on a stratified multistage sample design. The specific parameters of the design, however, have changed over time; a new sample design is implemented following each decennial census. For example, the 1973-84 survey design had 386 sample primary sampling units (PSU's), the 1985-94 survey design had 198 sample PSU's, and the current 1995-2004 survey design has 358 sample PSU's. The 1995-2004 NHIS has been designed to produce estimates for the Nation, for each of the four census regions, and within census regions by areas determined by

metropolitan and non-metropolitan status. Although the 1995-2004 survey samples from all of the States and the District of Columbia, it is not designed to produce reliable State-level estimates for every State (Botman et al., 2002).

#### Barriers to Initiation and Continuation of Vision Care Among Diabetics

The following barriers to initiation and continuation of vision care among diabetics were identified through the research review of literature:

- Access to Health Care - the process of receiving or attempting to receive medical care for eye examinations.
- Experiences to Health Care - perceived as discouraging access in a healthcare setting such as an HMO.
- Communication - between providers and patients.
- Language - different speaking capabilities.
- Cultural differences - between providers and patients.
- Gender - patient based.
- Health care delivery systems.



- Affordability, accessibility, and efficiency of care.
- Education of the disease to the patient.
- Provider barriers to care such as time constraints with patients.

#### Operational Definitions

The independent variables of interest to this research are those barriers to access identified previously. The dependent variables the *initiation* and *continuation* of their vision care.

Initiation of vision care is operationally defined as the first visit for vision care made within one year after diagnosis of diabetes.

Continuation of vision care is operationally defined as any vision care made after the initiated first visit of vision care, typically scheduled on an annual basis (every 12 months) after diagnosis of diabetes.

#### Questions and Answers to the 1999 National Health Interview Survey

Initiation was determined by the combination of having been diagnosed within the past 12 months and having had an eye examination involving a dilation within the past 12 months.

Continuation was measured by the response that the person had been diagnosed with diabetes more than 12 months ago and had an eye examination within the past 12 months. This indicator of continuity is less than ideal but is the best that can be developed from the survey questions. It does not tell us whether the most recent eye examination was one in a series of annual exams or was an episodic event. Analysis of ongoing repetition of eye examinations for a diabetic would require a different, time series data set.

*Question 1*

What is your gender at the time you were diagnosed with diabetes?

Response: Male/Female

*Question 2*

How old were you when a doctor first told you that you had diabetes or sugar diabetes?

Response: 1-100 years

*Question 3*

Was your diabetes diagnosed in the last 12 months?

Response: Yes/No

*Question 4*

Are you now taking insulin?

Response: Yes/No

*Question 5*

Have you ever taken a course or class on how to manage diabetes yourself?

Response: Yes/No

*Question 6*

Have you ever been told by a doctor or health professional that you had Macular Degeneration?

Response: Yes/No

*Question 7*

Do you have any trouble seeing, even when wearing glasses or contact lenses?

Response: Yes/No

*Question 8*

Are you blind or unable to see at all?

Response: Yes/No

*Question 9*

Is there a place that you usually go to when you are sick or need advice about your health?

Response: Yes/No

*Question 10*

Is there a place that you usually go to when you need routine preventive care services?

Response: Yes/No

*Question 11*

What kind of place do you usually go to when you need routine preventive care services?

Response: Clinic/Doctors Office/Emergency  
Room/Other

*Question 12*

There are many reasons people delay getting medical care. Have you delayed getting care for any of the following reasons in the past 12 months?

Response: Telephone/Appointment Issue/Wait too  
Long/Office not Open/Transportation

*Question 13*

During the past 12 months, was there any time when you needed any of the following (prescription medicines, mental health care or counseling, dental care or eyeglasses) but didn't get it because you couldn't afford it?

Response: Yes/No

*Question 14*

During the past 12 months have you seen or talked to an eye doctor?

Response: Yes/No

*Question 15*

Has your medical care been delayed due to cost?

Response: Yes/No

*Question 16*

Have you ever not received medical care due to cost?

Response: Yes/No

*Question 17*

Do you currently have healthcare coverage?

Response: Yes/No

## CHAPTER FOUR

### ANALYSIS

#### Utilization of Eye Examination

Based on the 1999 National Health Interview Survey, those persons sampled (30,801), between the ages of 1-84 years old, .04% (1,217) received their annual eye examination within 1-12 months after being diagnosed with diabetes. Of those also sampled during this survey, 12% diagnosed with diabetes received their eye examination in less than one month after diagnoses. All in all, less than 1% actually responded to the survey questions regarding their health and issues dealing with diabetes.

The following tables will illustrate the barriers to vision care as well as the number of those (by several different factors) diagnosed with diabetes.

#### Description of Sample

Table 1. Cross-Tabulation of Sex by Diagnosis of Diabetes

Crosstab						
			Ever been told you had diabetes			Total
			1 Yes	2 No	3 Borderline	
Sex 1 Male	Count		5089523	89712942	686371	95488836
	Column %		47.3%	47.9%	46.4%	47.9%
2 Female	Count		5665600	97523157	793795	103982552
	Column %		52.7%	52.1%	53.6%	52.1%
Total	Count		10755123	187236099	1480166	199471388
	Column %		100.0%	100.0%	100.0%	100.0%

Table 1 presents the percentages of male and female of the population of adults in 1999 by whether they were diagnosed with diabetes or not. Those diagnosed with diabetes were further self-described as "borderline" or "diabetic". Males constituted 47 percent of the total population and 47 percent of those diagnosed with diabetes. Correspondingly, females were 52 percent of the population and 53 percent of those diagnosed with diabetes.

## Crosstab

Table 2 presents those diagnosed with diabetes are older than the population as a whole. Persons aged 5-60 years of age constitute 23.5 percent of those diagnosed with diabetes, but only 13.7 percent of the total population. Those 65 years of age and older comprise 49.7 percent of those diagnosed with diabetes, but only 18.3 percent of the total population. This is due to the fact that persons over the age of 65 are less likely to seek medical treatment and early diagnosis as reported in the literature review. This is consistent with other studies reporting the importance of early detection.

#### Data Set Information

Table 3. Cross-Tabulation of Diagnosis of Diabetes by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab									
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total	
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never		
1 Yes	When was diabetes diagnosed	1 3 months ago or less	Count	113122	24399	39282	67359	244162	
			Row %	46.3%	10.0%	16.1%	27.6%	100.0%	
	2 More than 3 months ago, but not more than 6 m	Count	163751	32732	51295	13534	261312		
		Row %	62.7%	12.5%	19.6%	5.2%	100.0%		
	3 More than 6 months ago, but not more than	Count	128154	10932	27716	25024	191826		
		Row %	66.8%	5.7%	14.4%	13.0%	100.0%		
	4 More than 9 months ago, but not more than	Count	229871	43735	55041	58425	387072		
		Row %	59.4%	11.3%	14.2%	15.1%	100.0%		
	Total		Count	634898	111798	173334	164342	1084372	
			Row %	58.5%	10.3%	16.0%	15.2%	100.0%	

Table 3 shows no difference in the initiation with the diagnosis of diabetes and dilation during their eye



exam. Those diagnosed within the last 6 months with diabetes (62%), had a greater difference in the initiation of dilation during their eye exam then those who had been diagnosed less then 3 months ago with diabetes (46%).

Table 4. Cross-Tabulation of Those Taking Insulin by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab					Last eye exam where pupils were dilated				Total
Diabetes diagnosed, past 12 months					1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Are you NOW taking insulin	1 Yes	Count		40519	1948	4448	11714	58629
			Row %		69.1%	3.3%	7.6%	20.0%	100.0%
		2 No	Count		596748	109850	168886	152628	1028112
			Row %		58.0%	10.7%	16.4%	14.8%	100.0%
	Total		Count		637267	111798	173334	164342	1086741
			Row %		58.6%	10.3%	15.9%	15.1%	100.0%
2 No	Are you NOW taking insulin	1 Yes	Count		20700	28401			49101
			Row %		42.2%	57.8%			100.0%
		2 No	Count		193280	64250	76099	37804	371433
			Row %		52.0%	17.3%	20.5%	10.2%	100.0%
	Total		Count		213980	92651	76099	37804	420534
			Row %		50.9%	22.0%	18.1%	9.0%	100.0%

Table 4 indicates among those recently diagnosed with diabetes and are taking insulin, 69.1 percent reported having an eye exam within the past 12 months compared to the 58 percent of those who were not taking insulin. Among those previously diagnosed with diabetes and are taking insulin, 42.2 percent reported having an eye exam within the past 12 months compared to the 52 percent of those who were not taking insulin. This table indicates that those who were previously diagnosed with diabetes and are taking

insulin are considerably less likely to continue vision care compared to those who have been recently diagnosed. This is also consistent with the literature review studies reporting the importance of vision care among diabetics.

Table 5. Cross-Tabulation of Those Ever Taken a Class/Course on Diabetes Management by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Ev taken class/course on diabetes mngmt	1 Yes	Count	271698	38367	39671	57700	407436
			Row %	66.7%	9.4%	9.7%	14.2%	100.0%
		2 No	Count	365569	73431	133663	106642	679305
			Row %	53.8%	10.8%	19.7%	15.7%	100.0%
	Total		Count	637267	111798	173334	164342	1086741
			Row %	58.6%	10.3%	15.9%	15.1%	100.0%
2 No	Ev taken class/course on diabetes mngmt	1 Yes	Count	138614	32596	25047	23235	219492
			Row %	63.2%	14.9%	11.4%	10.6%	100.0%
		2 No	Count	75366	60055	51052	14569	201042
			Row %	37.5%	29.9%	25.4%	7.2%	100.0%
	Total		Count	213980	92651	76099	37804	420534
			Row %	50.9%	22.0%	18.1%	9.0%	100.0%

Table 5 indicates among those recently diagnosed with diabetes and having taken a class/course on diabetes management, 66.7 percent reported having an eye exam within the past 12 months. Among those previously diagnosed with diabetes and having taken a class/course on diabetes management, 63.2 percent reported having an eye exam within the past 12 months. This table shows no difference in vision care seeking between those recently

diagnosed with diabetes and those previously diagnosed with diabetes and taking a class/course on diabetes management. The initiation and continuation of eye exams are at a similar rate, therefore, self-management classes appear not to relate to vision care.

Table 6. Cross-Tabulation of Those That Have Been Told They had Macular Degeneration by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

				Crosstab					
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total	
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never		
1 Yes	Ever told you had macular degeneration	1 Yes	Count	16946	10442			27388	
			Row %	61.9%	38.1%			100.0%	
		2 No	Count	620321	101356	173334	160977	1055988	
			Row %	58.7%	9.6%	16.4%	15.2%	100.0%	
	Total	Count		637267	111798	173334	160977	1083376	
		Row %		58.8%	10.3%	16.0%	14.9%	100.0%	
2 No	Ever told you had macular degeneration	1 Yes	Count	23883				23883	
			Row %	100.0%				100.0%	
		2 No	Count	190097	92651	76099	37804	396651	
			Row %	47.9%	23.4%	19.2%	9.5%	100.0%	
	Total	Count		213980	92651	76099	37804	420534	
		Row %		50.9%	22.0%	18.1%	9.0%	100.0%	

Table 6 indicates among those recently diagnosed with diabetes and having macular degeneration, 61.9 percent reported having initiated an eye exam compared to the 58.7 percent of those recently diagnosed with diabetes and not having macular degeneration who reported having a recent eye exam. Among those previously diagnosed with diabetes and having macular degeneration, 100 percent reported having an eye exam within the past 12 months. For those

who have been previously diagnosed with diabetes and have macular degeneration seem to continue their vision care compared to those who have been recently diagnosed with diabetes and having macular degeneration initiating vision care.

Table 7. Cross-Tabulation of Those Having Trouble Seeing Even With Glasses by Last Eye Exam Where Pupils were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab									
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total	
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never		
1 Yes	Trouble seeing even w/glasses/lenses	1 Yes	Count	94646	29805	63013	42972	230436	
			Row %	41.1%	12.9%	27.3%	18.6%	100.0%	
		2 No	Count	542621	81993	110321	121370	856305	
			Row %	63.4%	9.6%	12.9%	14.2%	100.0%	
	Total	Count	637267	111798	173334	164342	1086741		
		Row %	58.6%	10.3%	15.9%	15.1%	100.0%		
	2 No	Trouble seeing even w/glasses/lenses	1 Yes	Count	40382	23033	16988		80403
				Row %	50.2%	28.6%	21.1%		100.0%
2 No			Count	173598	69618	59111	37804	340131	
			Row %	51.0%	20.5%	17.4%	11.1%	100.0%	
Total		Count	213980	92651	76099	37804	420534		
		Row %	50.9%	22.0%	18.1%	9.0%	100.0%		

Table 7 indicates among those who reported having trouble seeing even with their glasses, less than half (41 percent) reported initiating having an eye exam in the past 12 months. Among those previously diagnosed with diabetes and who reported having trouble seeing with their glasses only half (50.2 percent) report having an eye exam in the past year. There is only a 9 percent difference between those recently diagnosed with diabetes and those previously diagnosed with diabetes who had trouble seeing

with their glasses and reported having had an eye exam in the past 12 months.

Table 8. Cross-Tabulation of Those That are Blind or Unable to See at All by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Are you blind or unable to see at all	1 Yes	Count	12090				12090
			Row %	100.0%				100.0%
		2 No	Count	82556	29805	63013	42972	218346
			Row %	37.8%	13.7%	28.9%	19.7%	100.0%
	Total	Count	94646	29805	63013	42972	230436	
		Row %	41.1%	12.9%	27.3%	18.6%	100.0%	
2 No	Are you blind or unable to see at all	1 Yes	Count	9698				9698
			Row %	100.0%				100.0%
		2 No	Count	30684	23033	16988		70705
			Row %	43.4%	32.6%	24.0%		100.0%
	Total	Count	40382	23033	16988		80403	
		Row %	50.2%	28.6%	21.1%		100.0%	

Table 8 indicates among those recently diagnosed with diabetes and who are blind, 100 percent reported having an eye exam compared to only 37.8 percent of those reported not being blind had an eye exam. Among those previously diagnosed with diabetes and are blind, 100 percent reported having an annual eye exam.

Table 9. Cross-Tabulation of Having a Place Where a Person Usually Goes to When Sick by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab									
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total	
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never		
1 Yes	Place USUALLY go when sick	1 Yes	Count	617537	104630	164939	138477	1025583	
			Row %	60.2%	10.2%	16.1%	13.5%	100.0%	
		2 There is NO place	Count	19730	7168	8395	25865	61158	
			Row %	32.3%	11.7%	13.7%	42.3%	100.0%	
	Total	Count	637267	111798	173334	164342	1086741		
		Row %	58.6%	10.3%	15.9%	15.1%	100.0%		
	2 No	Place USUALLY go when sick	1 Yes	Count	212906	86392	70714	35368	405380
				Row %	52.5%	21.3%	17.4%	8.7%	100.0%
2 There is NO place			Count	1074	6259	5385	2436	15154	
			Row %	7.1%	41.3%	35.5%	16.1%	100.0%	
Total		Count	213980	92651	76099	37804	420534		
		Row %	50.9%	22.0%	18.1%	9.0%	100.0%		

Table 9 indicates among those recently diagnosed with diabetes and having a usual place of care, 60.2 reported having an eye exam, compared to the 32.3 percent who reported not having a usual place of care and initiating vision care. Among those previously diagnosed with diabetes and who reported having a usual place of care, 52.5 percent reported having an annual eye exam; compared to only 7.1 percent of those who reported not having a usual place of care and continuing vision care. This table indicates that there is an 8 percent difference of those recently diagnosed with diabetes and those previously diagnosed with diabetes and having a place of care initiate vision care.

Table 10. Cross-Tabulation of a Person Having a Place Where they Usually Go for Routine Preventive Care by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab									
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total	
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never		
1 Yes	USUALLY go there for routine/prev care	1 Yes	Count	599315	104630	164939	101493	970377	
			Row %	61.8%	10.8%	17.0%	10.5%	100.0%	
		2 No	Count	11973			36984	48957	
			Row %	24.5%			75.5%	100.0%	
	Total	Count	611288	104630	164939	138477	1019334		
		Row %	60.0%	10.3%	16.2%	13.6%	100.0%		
		2 No	1 Yes	Count	212906	77584	68745	31228	390463
				Row %	54.5%	19.9%	17.6%	8.0%	100.0%
2 No	Count			8808	1969	4140	14917		
	Row %			59.0%	13.2%	27.8%	100.0%		
Total	Count	212906	86392	70714	35368	405380			
	Row %	52.5%	21.3%	17.4%	8.7%	100.0%			

Table 10 indicates among those recently diagnosed with diabetes and report having a place they usually go to for routine preventive care, 61.8 percent have initiated an eye exam; compared to 24.5 percent who reported not having a place to usually go to for routine preventive care but having initiated vision care. Among those previously diagnosed with diabetes and reported having a place they usually go to for routine preventive care, 54.5 percent report having had an eye exam within the past 12 months. No person previously diagnosed with diabetes and without a usual place for care reported having an annual vision examination.

Table 11. Cross-Tabulation of The Type of Place Where a Person Usually Goes to for Preventive Care by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab									
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total	
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never		
1 Yes	Place usually go for routine prev care	0 Doesn't get preventive care anywhere	Count	16564		8395	20235	45194	
			Row %	36.7%		18.6%	44.8%	100.0%	
		1 Clinic or health center	Count	4446			26959	31405	
			Row %	14.2%			85.8%	100.0%	
		2 Doctor's office or HMO	Count	8204			15655	23859	
			Row %	34.4%			65.6%	100.0%	
	6 Doesn't go to one place most often		Count	8738	7168			15906	
			Row %	54.9%	45.1%			100.0%	
	Total			Count	37952	7168	8395	62849	116364
				Row %	32.6%	6.2%	7.2%	54.0%	100.0%
2 No	Place usually go for routine prev care	0 Doesn't get preventive care anywhere	Count		6259	7354		13613	
			Row %		46.0%	54.0%		100.0%	
		1 Clinic or health center	Count	1074			4140	5214	
			Row %	20.6%			79.4%	100.0%	
	2 Doctor's office or HMO		Count		8808		2436	11244	
			Row %		78.3%		21.7%	100.0%	
	Total			Count	1074	15067	7354	6576	30071
				Row %	3.6%	50.1%	24.5%	21.9%	100.0%

Table 11 indicates among those recently diagnosed with diabetes and who reported not receiving preventive care services anywhere, 36.7 percent reported having initiated vision care. Among those who were previously diagnosed with diabetes and reported not receiving preventive care services anywhere, 46 percent reported having an eye exam within the past 13-24 months.



Table 12. Cross-Tabulation of Those Reporting an Issue With no Transportation by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab							
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated			
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never
1 Yes	No transportation, past 12 mo	1 Yes	Count	15325	7168	3115	7138
			Row %	46.8%	21.9%	9.5%	21.8%
		2 No	Count	621942	104630	170219	148110
			Row %	59.5%	10.0%	16.3%	14.2%
	Total		Count	637267	111798	173334	155248
			Row %	59.1%	10.4%	16.1%	14.4%
2 No	No transportation, past 12 mo	1 Yes	Count			8932	
			Row %			100.0%	
		2 No	Count	205828	92651	67167	37804
			Row %	51.0%	23.0%	16.6%	9.4%
	Total		Count	205828	92651	76099	37804
			Row %	49.9%	22.5%	18.5%	9.2%

Table 12 indicates among those recently diagnosed with diabetes who reported having no transportation problems, 59.5 percent report having initiated an eye exam; compared to 46.8 percent who had a transportation problem (a 13 percent difference). Among those who were previously diagnosed with diabetes, 0 percent of those who reported having a transportation problem obtained annual vision care compared to those who did not have a transportation problem at 51 percent. Those who were recently diagnosed with diabetes and having a transportation problem are less likely to initiate eye care. Those who were previously diagnosed with diabetes who reported having transportation problems are highly unlikely to continue their vision care.

Table 13. Cross-Tabulation of Those that can not Afford Eyeglasses by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than- 2 Years	5 Never	
1 Yes	Can't afford eyeglasses, past 12 mo	1 Yes	Count	48078	9116	45489	23007	125690
			Row %	38.3%	7.3%	36.2%	18.3%	100.0%
		2 No	Count	589189	102682	127845	141335	961051
			Row %	61.3%	10.7%	13.3%	14.7%	100.0%
	Total		Count	637267	111798	173334	164342	1086741
		Row %	58.6%	10.3%	15.9%	15.1%	100.0%	
2 No	Can't afford eyeglasses, past 12 mo	1 Yes	Count	20697	5502	36553	4074	66826
			Row %	31.0%	8.2%	54.7%	6.1%	100.0%
		2 No	Count	193283	87149	39546	33730	353708
			Row %	54.6%	24.6%	11.2%	9.5%	100.0%
	Total		Count	213980	92651	76099	37804	420534
		Row %	50.9%	22.0%	18.1%	9.0%	100.0%	

Table 13 indicates among those recently diagnosed with diabetes and who reported having difficulty affording eyeglasses, 38.3 percent report initiating vision care; compared to an initiation rate of 61.3 percent of those who have been recently diagnosed with diabetes and reported they could afford glasses. Among those previously diagnosed with diabetes and who reported having difficulty affording eyeglasses, 31 percent reported having had an eye exam in the past 12 months compared to 54.6 percent who had no difficulty with the cost of glasses. Affordability of eye glasses, therefore, constituted a barrier to both initiation and continuation of vision care.

Table 14. Cross-Tabulation of Those That Have Seen or Spoken to an Eye Doctor Within the Past 12 Months by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Seen/talk to eye doctor, past 12 mo	1 Yes	Count	464238	10530	10652	47239	532659
			Row %	87.2%	2.0%	2.0%	8.9%	100.0%
		2 No	Count	173029	101268	162682	117103	554082
			Row %	31.2%	18.3%	29.4%	21.1%	100.0%
	Total		Count	637267	111798	173334	164342	1086741
			Row %	58.6%	10.3%	15.9%	15.1%	100.0%
2 No	Seen/talk to eye doctor, past 12 mo	1 Yes	Count	162361	29401	41966		233728
			Row %	69.5%	12.6%	18.0%		100.0%
		2 No	Count	51619	63250	34133	37804	186806
			Row %	27.6%	33.9%	18.3%	20.2%	100.0%
	Total		Count	213980	92651	76099	37804	420534
			Row %	50.9%	22.0%	18.1%	9.0%	100.0%

Table 14 indicates among those recently diagnosed with diabetes and who reported having seen or spoken to an eye doctor, 87.2 percent report initiating vision care where their pupils were dilated. Among those previously diagnosed with diabetes and who reported having seen or spoken to an eye doctor, 69.5 percent report having an eye exam where their pupils were dilated. Those that have been recently diagnosed with diabetes also were more likely than those previously diagnosed with diabetes to have an eye exam where their pupils are dilated. Having seen or talked to a doctor during the previous twelve months of diagnosis is an important factor for whether vision care was initiated or continued.

Table 15. Cross-Tabulation of Medical Care Being Delayed Due to Cost by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Was med care delayed for -- (cost), 12m	1 Yes	Count	42471	14321	53713	52497	163002
			Row %	26.1%	8.8%	33.0%	32.2%	100.0%
		2 No	Count	594796	97477	119621	111645	923739
			Row %	64.4%	10.6%	12.9%	12.1%	100.0%
	Total	Count		637267	111798	173334	164342	1086741
		Row %		58.6%	10.3%	15.9%	15.1%	100.0%
2 No	Was med care delayed for -- (cost), 12m	1 Yes	Count	32097	27229	24999	11892	96217
			Row %	33.4%	28.3%	26.0%	12.4%	100.0%
		2 No	Count	181883	65422	51100	25912	324317
			Row %	56.1%	20.2%	15.8%	8.0%	100.0%
	Total	Count		213980	92651	76099	37804	420534
		Row %		50.9%	22.0%	18.1%	9.0%	100.0%

Table 15 indicates among those recently diagnosed with diabetes and who reported having a delay in medical care due to cost, only 26.1 percent reported initiating vision care. Among those previously diagnosed with diabetes and reported having a delay in medical care due to cost, only 33.4 percent reported having an eye exam in the past 12 months. Having delayed medical care because of cost appears to have been a factor for both initiation and continuation of vision care.

Table 16. Cross-Tabulation of Medical Care not Being Received Due to Cost by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Did -- NOT get medical care (cost), 12m	1 Yes	Count	31957	14858	22686	27895	97396
			Row %	32.8%	15.3%	23.3%	28.6%	100.0%
		2 No	Count	605310	96940	150648	136447	989345
			Row %	61.2%	9.8%	15.2%	13.8%	100.0%
	Total		Count	637267	111798	173334	164342	1086741
			Row %	58.6%	10.3%	15.9%	15.1%	100.0%
2 No	Did -- NOT get medical care (cost), 12m	1 Yes	Count	31605	6259	5385	11892	55141
			Row %	57.3%	11.4%	9.8%	21.6%	100.0%
		2 No	Count	182375	86392	70714	25912	365393
			Row %	49.9%	23.6%	19.4%	7.1%	100.0%
	Total		Count	213980	92651	76099	37804	420534
			Row %	50.9%	22.0%	18.1%	9.0%	100.0%

Table 16 indicates among those recently diagnosed with diabetes and who reported not receiving medical care due to cost, only 32.8 percent reported initiating vision care compared to 61.2 percent who reported not obtaining care because of cost. Among those previously diagnosed with diabetes and who reported not receiving medical care due to cost, 57.3 percent report having had an eye exam in the past 12 months compared to 49.9 percent who had no difficulty with the costs of care. Not obtaining care due to cost was also related to whether diabetics initiated vision care but less so for an annual examination.

Table 17. Cross-Tabulation of a Person Having Health Care Coverage by Last Eye Exam Where Pupils Were Dilated in the Past 12 Months of Diabetes Diagnosis

Crosstab								
Diabetes diagnosed, past 12 months				Last eye exam where pupils were dilated				Total
				1 Within 12 Months	3 13 to-24 Months	4 More than 2 Years	5 Never	
1 Yes	Does -- have health care coverage?	1 Yes	Count	599546	104630	166279	126914	997369
			Row %	60.1%	10.5%	16.7%	12.7%	100.0%
		2 No	Count	37721	7168	7055	37428	89372
			Row %	42.2%	8.0%	7.9%	41.9%	100.0%
	Total		Count	637267	111798	173334	164342	1086741
		Row %	58.6%	10.3%	15.9%	15.1%	100.0%	
2 No	Does -- have health care coverage?	1 Yes	Count	208377	65422	70714	33664	378177
			Row %	55.1%	17.3%	18.7%	8.9%	100.0%
		2 No	Count	5803	27229	5385	4140	42357
			Row %	13.2%	64.3%	12.7%	9.8%	100.0%
	Total		Count	213980	92651	76099	37804	420534
		Row %	50.9%	22.0%	18.1%	9.0%	100.0%	

Table 17 indicates among those recently diagnosed with diabetes and who reported having health care coverage, 60.1 percent reported initiating vision care; compared to the 42.2 percent who reported having no health care coverage. Among those previously diagnosed with diabetes and who reported having health care coverage, 55.1 percent reported having an eye exam in the past 12 months compared to the annual rate of only 13.2 percent for those without health insurance. Having health insurance appears to have been more important of a factor for those recently diagnosed with diabetes and even more important for those who were previously diagnosed with diabetes.

## CHAPTER FIVE

### DISCUSSION

The purpose of this study was to determine the barriers to initiation and continuation of vision care among diabetics. The findings of this study indicated that 47 percent of those surveyed were male and diagnosed with diabetes, while 53 percent of those surveyed were female and diagnosed with diabetes.

The 1999 NHIS data set findings conclude that those diagnosed with diabetes are older than the population as a whole. Persons aged 5-60 years of age constitute 23.5 percent of those diagnosed with diabetes, but 13.7 percent of the total population. Those 65 years of age and older comprise of 49.7 percent of those diagnosed with diabetes, but only 18.3 percent of the total population.

Not surprisingly, the majority of the data set findings conclude that those who have been recently diagnosed with diabetes tend to seek out vision care within 12 months of their diabetes diagnosis; compared to those who have been previously diagnosed with diabetes. This could be due to those who have been recently diagnosed with diabetes have a "fear factor" of losing

their vision and therefore, seek vision care immediately based on their disease.

It was surprising to discover that there was no difference found between those recently diagnosed with diabetes and those previously diagnosed with diabetes and initiating vision care after taking a class/course on diabetes management. It was noted that self-management classes appear not to relate to vision care.

Among those barriers identified that prevent initiation and continuation of vision care among diabetics were sex, age, insulin takers, education of diabetes, macular degeneration, trouble seeing with their glasses, blindness, usual place of care, preventive care, transportation, affordability of eye glasses, cost of care and having health insurance.



## CHAPTER SIX

### CONCLUSION

With an early diagnosis of diabetes, intensive treatment, long-term care, consistent follow up evaluations for diabetic patients are essential for effective treatment; especially when it comes to a member's vision care. With these above stages set in place a person can significantly lower the risk of blindness that is a cause from diabetes. Early referral for eye care and prompt and appropriate intervention lessen the risk for and the severity of vision loss related to diabetes.

Many problems with vision related to diabetes can be treated with much success if caught early. Diabetics must be taught how to manage their illness, seek medical attention and receive annual eye examinations in order to prevent the progression of diabetic retinopathy.

With the correct treatment and referral process in place, many diabetic members can receive the quality of care they need in order to help prevent the loss of vision. In order to achieve this, persons must be allowed proper access and efficiency to healthcare to meet their needs of care. Communication between the provider and his/her patient must be met, not just by language, but

also with the understanding of how to care for themselves and deal with their disease. With communication, education comes into play. It is the provider's responsibility to educate the patient about their disease and how to prevent further illness. It is then the patient's responsibility to continue to educate themselves and to obtain the proper care when needed, such as receiving an annual diabetic eye exam.

Affordability of healthcare must also decrease to allow different populations adequate healthcare means at a price they can afford (i.e. co-pays for office visits, monthly dues). This can be achieved through state funded programs, county clinics or federally qualified healthcare clinics. These types of programs can allow all persons (both uninsured and underinsured) to receive the proper healthcare they need in order to prevent any vision loss that may occur.

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