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Quality of care received by type I diabetic patients : An assessment protocol developed from the American Diabetes Association's standards

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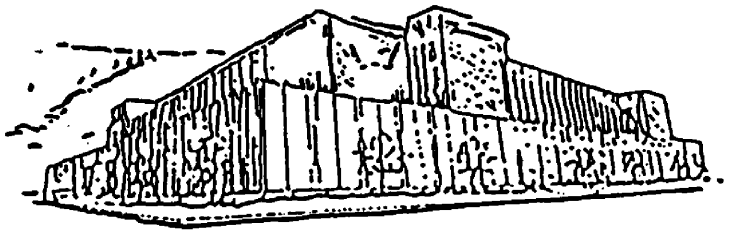

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QUALITY OF CARE RECEIVED BY TYPE I DIABETIC PATIENTS: AN ASSESSMENT PROTOCOL DEVELOPED FROM THE AMERICAN DIABETES ASSOCIATION'S STANDARDS

A Professional Paper

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To My Husband Jeff:

As a little girl I dreamed of a man who would make my life complete,

you are that man.

You are my true love, my best friend, my biggest supporter,

I am so lucky.

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I would also like to make a special dedication to my Grandmother, Lois Weir, and my Grandfather, Frank Preste, I think of you often and I miss you.

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CHAPTER 1

Introduction

Billions of dollars are spent in the United States each year for the treatment of diabetes. Over half that cost is spent on patient hospitalizations caused from the complications associated with diabetes. (Ratner, 1996) Results of randomized clinical trials by the Diabetes Control and Complications Trial demonstrated that in patients with type 1 diabetes the risk of development or progression of long-term complications is reduced 50-75% by intensive treatment programs. The reduction in risk of complications from diabetes correlates with the patient's achievement of near normal or normal blood glucose levels. (American Diabetes Association: Clinical Practice Recommendations, 1995; American Diabetes Association: Clinical Practice Recommendations, 1997) For the past several years the American Diabetes Association (ADA) has been actively involved in developing diabetes care standards and guidelines to aid in the establishment of intensive treatment programs. These standards and guidelines are issued annually and are known as the American Diabetes Association: Clinical Practice Recommendations. Specific guidelines for the treatment of patients with diabetes are referred to as the ADA's "Standards of Medical Care for Patients With Diabetes Mellitus." The treatment goal of the standards of medical care is to prevent acute complications and to reduce the risk of long-term complications by lowering blood glucose levels to or near normal. (American Diabetes Association: Clinical Practice Recommendations, 1995; American Diabetes Association: Clinical Practice Recommendations, 1997) This treatment goal can only be achieved if physicians provide

intensive treatment programs for their patients. The standards of medical care offer clinics and hospitals a unique opportunity to review the quality of care their physicians are providing for patients with diabetes.

Objectives of Professional Paper

The objectives of this professional paper are, 1) to provide a model of an assessment process to judge physician compliance to the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus", 2) to provide assessment results using a participating clinic in Montana as a model, 3) to design a one-page retrospective assessment tool to gather the information needed to assess physician compliance to the ADA Standards who treat patients with type 1 diabetes, and 4) to offer recommendations which will include the design of a one-page flow-sheet that can be placed in all medical charts of patients with type 1 diabetes to prompt physician adherence.

Assumptions

For the purpose of this study the following assumptions were made:

1. The quality of a physician's medical care includes many aspects, for the purpose of this study quality of care was specifically related to physician compliance to the ADA Standards of Care.
2. The ADA Standards allow for differing interpretations, however, for the purpose of this study the strictest interpretation of the ADA Standards was assumed to insure optimal care for all patients with type 1 diabetes.

3. Patients are defined as having type 1 diabetes if they were diagnosed with diabetes before the age of 40 years and/or they started insulin therapy within the first year of diagnosis. (American Diabetes Association: Clinical Practice Recommendations, 1995; American Diabetes Association: Clinical Practice Recommendations, 1997)
4. Physicians received visitation credit if the patient was seen for a diabetic or non-diabetic visit. Type 1 diabetes affects all aspects of medical care received by the patient and should always be discussed by the physician regardless of the type of visit.
5. If a patient with type 1 diabetes had an appointment with a dietitian, nurse educator, or ophthalmologist the patient's diabetes physician received referral credit.

Delimitations

1. The subjects of this study were the physicians employed at the participating clinic treating patients with type 1 diabetes.
2. The participating clinic consists of a main clinic and two satellite clinics. The main clinic provides services for a community of approximately 100,000 people. The satellite clinics provide services for rural communities.
3. This project was limited to review of physician compliance regarding the ADA's Standards. Patient charts were reviewed to assess physician compliance, patient compliance was not a focus of this project.

4. Medical charts of patients with type 1 diabetes were reviewed for the years of 1995 and 1996. These years were chosen because they provide current information on care by physicians still employed at the clinic and the ADA's yearly update to their Clinical Practice Recommendations did not include any changes to the "Standards of Medical Care for Patients With Diabetes Mellitus".
5. Medical charts of patients with type 1 diabetes receiving hemodialysis or peritoneal dialysis were excluded from the study based on the patient's need for varying treatment.
6. Data from medical charts of patients with type 1 diabetes were excluded from the study if during the last documented visit their physician stated that the patient needed to return for a check-up during a specified time period and the patient never returned. The years of 1995 and 1996 were judged separately according to this criteria.
7. Data collected from 1995 were excluded from the study if the patient established care with the physician or was diagnosed with type 1 diabetes during that year, however, the data collected from 1996 were included. Likewise, data collected from 1996 were excluded if the patient established care with the physician or was diagnosed with type 1 diabetes during that year.
8. Data from patients with type 1 diabetes were excluded from the study if they were receiving care from another physician not employed at the participating clinic and were seen by a physician at the participating clinic on a referral basis.

9. Data from patients with type 1 diabetes were excluded from the study if the physician stated in the patient's file that the patient was non-compliant to treatment and was deliberately avoiding care.
10. Physicians treating children with type 1 diabetes were not held accountable for the lipid profile standard due to the ADA stipulation "if values fall within accepted risk levels, assessment should be repeated every five years." (American Diabetes Association: Clinical Practice Recommendations, 1995)
11. This study focuses on only one participating clinic. No attempt will be made to generalize any of this study's findings to other clinics or hospitals.

Significance of Professional Paper

The ADA's recommendations for the treatment of patients with diabetes are considered the gold standard in the health care community, however, the question needs to be asked "Are those standards of medical care being followed by physicians and other health care providers?" The ADA suggests that if intensive treatment regimens were followed, a decrease in the amount of money spent on the treatment of diabetes would be seen due to the decrease in the incidence of long-term complications. However, the cost of treating patients with diabetes for long-term complications continues to rise at a rate disproportionate to other health care costs. In fact, 4.5% of the population, those with diabetes, accounted for 14.6% of the total health care expenditure in the United States in 1992, or $105 billion; 66% of that cost was spent on hospitalizations due to long-term

complications. (Ratner, 1996) A review of the literature has shown only one documented study assessing compliance to the ADA Standards, however, this study was performed on rural physicians in Ohio caring for patients with type 2 diabetes. (Zoorob & Mainous, 1996) This suggests that health care providers may be unaware of the quality of care physicians are providing to their patients with diabetes. Quality of physician care for patients with diabetes is unlikely to improve if clinics and hospitals continue this approach.

This professional paper has clinical significance. This project should serve other participating clinics in several ways by, first, providing a model of an assessment process to judge physician compliance to the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus". Second, assessment results will be provided using a clinic in Montana as a model to demonstrate the assessment process. Third, this project will provide the design of a one-page retrospective assessment tool which follows the ADA Standards to collect information from patient's medical charts who have type 1 diabetes. Fourth, this project will provide the design of a one-page flow-sheet that can be placed in all medical charts of patients with type 1 diabetes enabling physicians to track the ADA Standards to help prompt adherence.

CHAPTER 2

Review of Related Literature

Types and Prevalence of Diabetes

Diabetes Mellitus is characterized by persistent hyperglycemia due to insulin deficiency or to resistance of the body's cells to the action of insulin. Four major types of diabetes have been defined by the National Diabetes Data Group and the World Health Organization: insulin-dependent diabetes mellitus (IDDM) or type 1 diabetes, non-insulin-dependent diabetes mellitus (NIDDM) or type 2 diabetes, gestational diabetes mellitus (GDM), and diabetes secondary to other conditions. (Harris, 1995)

In 1993 the National Health Interview Survey reported approximately 7.8 million diagnosed cases of diabetes in the United States. Patients with type 1 diabetes with onset at age less than 30 years comprise approximately 7% of all diagnosed cases. The remainder of diagnosed cases are considered to be patients with type 2 diabetes. Estimates suggest that there are approximately seven to eight million undiagnosed cases of type 2 diabetes in the United States. Diabetes secondary to other conditions occurs in 1-2% of all diabetes patients. GDM occurs in 3-5% of all pregnancies. Patients with diabetes comprise approximately 4.5% of the population in the United States. (Harris, 1995) For the purpose of this professional paper, this project is limited to the review of patient care in patients with type 1 diabetes.

In the United States it is estimated that 120,000 children (less than age 20 years) and approximately 300,000-500,000 individuals of all ages have type 1 diabetes. There may also be another 500,000 individuals with adult-onset type 1 diabetes who were

diagnosed after the age of 30 years. Incidence of type 1 diabetes is 30,000 new cases each year in the United States. More than half of these cases occur in children, making type 1 diabetes one of the most frequent chronic disease in United States children. (Harris, 1995)

More than 80% of type 1 diabetes cases occur in children with no family history of the disease. Occurrence of type 1 diabetes among identical twins is only 30-50%, much less than would be expected for a disease with strictly a genetic basis. However, in families with a person who has type 1 diabetes, a relative's risk of type 1 diabetes is much greater. Prevalence of type 1 diabetes by age 30 in siblings or children of patients with type 1 diabetes is 2-6% compared to only less than 0.2% in the general population. (Harris, 1995)

Epidemiological Patterns of Type 1 Diabetes

Average Age of Onset

A Diabetes Epidemiological Research Group in Pittsburgh, PA researched the incidence of type 1 diabetes by the age of onset. They reported that there are few cases of type 1 diabetes developing within the first year of life. Evidence suggests that the age-of-onset of type 1 diabetes characteristically falls during the pubertal peak. (Gavard, 1996) Onset of type 1 diabetes is most frequent at age 10-14 years. Males are slightly older in age at onset than females. (Cowie & Harris, 1995; LaPorte, Matsushima, & Chang, 1995)

Age and Sex Distribution

The age distribution among adult patients with type 1 diabetes is very different from the total adult population. The median age among patients with type 1 diabetes age older than 18 is 32 years, as opposed to 40 years for persons without diabetes. A study done in Allegheny County, PA between the years of 1965-89 showed an age range of 0-44 years among persons with type 1 diabetes who were diagnosed before the age of 20 years; most of these patients were between the ages of 25-29. In the United States studies indicate that there are slightly more white males (53.4%) older than 18 with type 1 diabetes than white females (46.6%) older than 18. (Cowie & Harris, 1995)

Racial Differences

Ethnic and racial differences are clear in the incidence of type 1 diabetes. The highest incidence is among white children with 13.3-20.6 per 100,000 new cases each year. Puerto Rican children average 15.2 new cases per 100,000 each year. These two groups are followed by Mexican-American children (4.1-9.7/100,000) and black children (3.3-11.0/100,000). (Gavard, 1996)

Seasonal Patterns

Onset of type 1 diabetes occurs in seasonal patterns. Research has shown a decline in the number of new cases in the summer months and a higher incidence during the winter months. (LaPorte et al., 1995) Studies on the seasonality of onset of type 1 diabetes have discovered that the onset of the disease parallels that of common

infections, such as congenital rubella syndrome and the mumps virus. Studies indicate that these infections may be related to type 1 diabetes. These common infections peak during late autumn and winter with few cases occurring in the summer months. (Gavard, 1996) This pattern is seen consistently across the nation. (LaPorte et al., 1995)

Duration of Type 1 Diabetes

Studies performed in Allegheny County, PA showed that duration (the length of time a person has been diagnosed with type 1 diabetes) of type 1 diabetes is evenly distributed between 0-24 years. Most patients with type 1 diabetes (60%) have durations lasting at 15 years or more. (Cowie & Harris, 1995)

Life Expectancy

The life expectancy of patients with type 1 diabetes is reduced by approximately 15 years. The majority of deaths of individuals with type 1 diabetes occurs in middle and late adulthood, with greater than 15% of patients with type 1 diabetes dying by the age of 40. Mortality rates in male patients with type 1 diabetes are five to seven times and in females 9 to 12 times that of the general United States population. The leading cause of death for persons with type 1 diabetes changes with the duration of the disease. Acute coma is the leading cause of death in the early years after diagnosis. Renal disease is the leading cause of death in the middle years. Two-thirds of deaths result from cardiovascular disease in patients who have had type 1 diabetes for more than 30 years. (Harris, 1995)

Possible Causes of Type 1 Diabetes

Type 1 diabetes is characterized by the absence of insulin activity. Patients with type 1 diabetes may be of any age, are not usually obese, and often have abrupt onset of signs and symptoms before the age of 30. Hyperglycemia, and often times ketones present in the urine, are signs of type 1 diabetes in the newly diagnosed patient. Symptoms of type 1 diabetes includes polydipsia, polyphagia, and polyuria. Insulin therapy is needed to sustain life. (Ratner, 1996)

The cause of type 1 diabetes is still not clearly understood. Genetic and environmental risk factors have been researched and both appear to contribute to the disease. Environmental risk factors include infectious agents, stress, lack of breast-feeding, and ingestion of cow's milk proteins. (Gavard, 1996)

The research states that for some reason the body produces antibodies against its own insulin producing beta islet cells effectively destroying them. Researchers suggest this may occur because a foreign substance, a bacterium or virus, invades the body. This foreign substance is believed to be similar to the insulin producing beta cells of the pancreas. The body may recognize this substance as a bacterium or virus and develop antibodies against the foreign substance, destroying it along with the beta cells. (Dorman, McCarthy, O'Leary, & Koehler, 1995; Gavard, 1996)

Genetic Risk Factors

Genetic research has found that persons are susceptible to type 1 diabetes if they contain unique gene markers located on chromosome 6. Persons with type 1 diabetes are

significantly more likely to have these unique gene markers than persons without diabetes. However, these gene markers are common in the general population and a great majority of the individuals with these unique gene markers do not develop type 1 diabetes. This evidence suggests individuals may inherit a susceptibility to the disease. Genetic susceptibility to type 1 diabetes may make certain individuals more likely to develop the disease if they come into contact with an environmental risk factor. (Dorman et al., 1995; Gavard, 1996)

Environmental Risk Factors

Environmental risk factors may initiate beta cell destruction resulting in either a slow, progressive beta cell destruction that may take years to result in the disease or rapid destruction of beta cells quickly initiating the diabetes condition. Epidemiological patterns of most infectious diseases, particularly viral illnesses, are similar to those of type 1 diabetes. These similarities include age of onset in mainly younger age groups and a more frequent occurrence of the disease during the winter months. Viruses associated with the development of type 1 diabetes are the Coxsackie B virus, congenital rubella syndrome, and the mumps virus. These viruses may initiate type 1 diabetes through the rapid destruction of beta cells or they may merely damage beta cells developing into type 1 diabetes with the action of additional environmental stressors. (Dorman et al., 1995; Gavard, 1996)

Stress has been implicated as a causal agent in persons with type 1 diabetes. Studies indicate a greater proportion of adolescents with diabetes suffered a parental loss

before onset compared to adolescents without diabetes. Parental loss was defined as divorces, separations, or deaths. Other studies indicate a greater number of adolescents with type 1 diabetes suffered a severe life event three years prior to onset. Severe life events included highway accidents and breaking off a significant relationship. These findings suggest stress may be an initiating factor for type 1 diabetes in a genetically susceptible individual. (Dorman et al., 1995; Gavard, 1996)

Various nutritional practices have been associated with the development of type 1 diabetes. The immunologic properties of breast-feeding may provide a protective effect against the development of type 1 diabetes. Studies indicate a smaller proportion of children with type 1 diabetes had been breast-fed and for shorter periods of time than their siblings without type 1 diabetes. However, the protection against type 1 diabetes may not come directly from breast milk but from the delay of other milk products such as cow's milk. An increased risk of type 1 diabetes has been associated with the introduction of breast milk substitutes before the age of three months. Cows' milk is the most widely studied breast milk substitute. The infants body, through an autoimmune response, attacks its own insulin producing beta cells. An infant's gut is in an immature state approximately three months after birth. A cow's milk protein, bovine serum albumin, may pass directly into the infant's bloodstream causing the infant's immune system to become sensitized. The beta cells and the cow's milk protein are so similar the infant's immune system is unable to distinguish between them. The infant's immunologic reaction to the cow's milk protein destroys it and the insulin producing beta cells. This theory has been supported by elevated bovin serum albumin antibodies

in recently diagnosed children with type 1 diabetes. (Dorman et al., 1995; Gavard, 1996)

Studies in Canada, the United States, Sweden, Finland, and other countries have found a positive correlation between the incidence of type 1 diabetes and the intake of cow's milk and a negative correlation between type 1 diabetes and breast-feeding through at least the age of three months. A study in Allegheny County, PA on Caucasian children with type 1 diabetes revealed that these children were 50% less likely to have been breast-fed than those without type 1 diabetes. A study in Colorado on the early exposure to cow's milk and type 1 diabetes discovered that individuals with type 1 diabetes were 11 times more likely to have been exposed to cow's milk before the age of three months. Many studies on breast-feeding or early exposure to cow's milk and the development of type 1 diabetes revealed that patients with type 1 diabetes were 43% more likely to have been breast-fed less than three months and 63% more likely to have been exposed to cow's milk before the age of three to four months. These studies further conclude that the early exposure to cow's milk may be an important risk factor for the development of type 1 diabetes and appears to increase the risk by 50%. (Dorman et al., 1995; Gavard, 1996)

Complications of Type 1 Diabetes

Approximately $105 billion is spent each year caring for patients with diabetes, 14.6% of the total health care cost in the United States. More than 600,000 emergency room visits are required annually by persons with diabetes, and when hospitalized, persons with diabetes stay almost three days longer compared to individuals with

diabetes. Hospitalizations account for 66% of the total health care costs for persons with diabetes. This suggests an enormous health care savings if the complications caused by diabetes can be prevented. (Ratner, 1996)

Acute Complications of Type 1 Diabetes

Diabetic Ketoacidosis

Complications from type 1 diabetes can be either acute or long-term. The most severe acute complication of type 1 diabetes is diabetic ketoacidosis (DKA). DKA is primarily a state of absolute insulin deficiency. Because insulin is not available, glucose cannot be used as a cellular fuel. The body then relies on the increased use of fat metabolism. As fat breakdown is increased, ketone bodies accumulate in the blood. When ketones, organic acids, accumulate faster than they can be used or excreted, ketosis results and blood pH drops, resulting in ketoacidosis (pH less than 7.3). If untreated, ketosis can lead to a coma, and eventually, death. DKA is identified in approximately 40% of patients with newly diagnosed type 1 diabetes and is responsible for more than 160,000 hospitalizations each year. The development of DKA in a person with known diabetes is often considered treatment failure. Studies have shown reasons for the occurrence of DKA which include lack of diabetes education and training, patient non-compliance, poor self-care, inadequate glucose monitoring, and psychological problems. (Fishbein & Palumbo, 1995) The most common cited cause to DKA is an acute illness or infection. A decrease in death from acute complications, such as DKA, has been attributed to the availability of insulin since 1922. (White & Henry, 1996)

Studies have shown a reduction in DKA hospitalizations when the patient was accompanied by patient education, follow-up care, and an increased access to medical advice. (Fishbein & Palumbo, 1995)

Hypoglycemia

Hypoglycemia, or an insulin reaction, occurs from an excess of insulin in the blood resulting in excessively low blood glucose levels. Each person is unique in the level of glucose that produces symptoms of hypoglycemia. (American Diabetes Association: Clinical Practice Recommendations, 1997) Hypoglycemia may range from mild (60-70 mg/dl) with minimal or no symptoms, to severe (less than 40 mg/dl). (Fishbein & Palumbo, 1995) Hypoglycemia usually occurs and is typically accompanied by warning signs which may include perspiration, rapid heartbeat, shakiness, anxiety, and hunger. Prevention of hypoglycemia occurs with the ingestion of carbohydrates. A hypoglycemic reaction can result in a loss of consciousness or a seizure if the individual does not present warning signs or ignores warning signs. More severe hypoglycemia reactions can occur if blood glucose levels continue to fall including confusion, stupor, and finally unconsciousness. (American Diabetes Association: Clinical Practice Recommendations, 1997)

Long-term Complications of Type 1 Diabetes

The majority of health care costs today are associated with the treatment of the chronic complications associated with diabetes. (Ratner, 1996) The Diabetes Control

and Complications Trial has demonstrated that near normal blood glucose levels can prevent or slow the progression of these diabetic complications. (American Diabetes Association: Clinical Practice Recommendations, 1995)

Microvascular Complications

The microvascular complications associated with diabetes are nephropathy, retinopathy, and neuropathy. For many decades, the cause of these complications remained unclear. Early cross-sectional and observational studies indicated an association between hyperglycemia and microvascular complications. However, a causal relationship was never determined. In the 1980s the methods to improve glycemic control, self-monitoring and intensive insulin treatments, and the methods to assess the impact of therapy, glycohemoglobin, became available and allowed for the initiation of prospective clinical trials. The Diabetes Control and Complications Trial (DCCT) recruited 1441 patients from 29 centers between 1983 and 1989. These subjects were followed for an average of 7 years. The trial was terminated in 1993. These randomized clinical trials were designed to compare the impact of intensive and conventional therapy on the development and progression of microvascular complications. The results of the DCCT conclusively proved that hyperglycemia causes microvascular and neuropathic complications in patients with type 1 diabetes. The DCCT also proved that in patients with type 1 diabetes intensive therapy both delays the onset and slows the progression of retinopathy, nephropathy, and neuropathy. (American Diabetes Association: Clinical Practice Recommendations, 1997)

Diabetic Nephropathy

Diabetes has become the fastest growing cause of end-stage renal disease (ESRD) in the United States. The number of new cases of diabetic ESRD has increased from 2200 people in 1980 to 13,300 people in 1989. These growing numbers are attributed to the increase in prevalence of diabetes and because patients with diabetes are living much longer today than in previous decades. Diabetic nephropathy accounts for about one-third of all cases of ESRD. Dialysis or kidney transplant are the only two options for survival. (Herman & Greene, 1996)

The first clinical evidence of nephropathy is the appearance of low levels of albumin in the urine, referred to as microalbuminuria. Patients with clinical signs of microalbuminuria are referred to as having incipient nephropathy. This stage usually occurs 10 to 15 years after diagnosis of type 1 diabetes. Urinary albumin increases at a rate of 10-20 % per year to the stage of overt nephropathy. Overt nephropathy develops 15 to 25 years after onset of diabetes in about 40% of people with type 1 diabetes. Overt nephropathy occurs in 80% of subjects with type 1 diabetes who have already developed incipient nephropathy. Fifty percent of patients with overt nephropathy progress to ESRD within 5 to 10 years, and greater than 75% by 20 years. ESRD is the leading cause of death in type 1 diabetes during middle age. (Herman & Greene, 1996)

Patients with type 1 diabetes usually develop hypertension at the same time as the development of microalbuminuria caused by diabetic nephropathy. Systolic and diastolic hypertension accelerate the progression of diabetic nephropathy. However,

antihypertensive intervention such as weight loss, reduction of salt and alcohol intake, exercise, and the use of angiotensin-converting enzyme (ACE) inhibitors greatly reduce mortality from 94% to 45% and a reduction in the need of dialysis and transplantation from 73% to 31% 16 years after the development of overt nephropathy. (American Diabetes Association: Clinical Practice Recommendations, 1997)

Diabetic Retinopathy

Diabetic eye disease is the leading cause of new cases of blindness in American adults aged 20-74. Blindness cause from diabetes is estimated to involve lost income and public welfare expense of $500 million annually. (Klein & Klein, 1995) The prevalence of retinopathy is strongly related to the duration of diabetes. Vision threatening retinopathy does not usually occur in patients with type 1 diabetes in the first five years of diabetes or before puberty. However, within the next 20 years nearly all patients with type 1 diabetes develop retinopathy. (Herman & Greene, 1996) Diabetic retinopathy is characterized by specific alterations in the appearance of the retina. (Klein & Klein, 1995)

Diabetic retinopathy advances in progressive stages. Nonproliferative diabetic retinopathy is the earliest stage and most often is first seen as a retinal microaneurysm, a small out-pouching of a retinal capillary that appears as a small red dot on the retina. Preproliferative diabetic retinopathy, the second stage, is characterized by closure of retinal capillaries and arterioles. These changes cause the nerve fibers of the retina to swell. Proliferative diabetic retinopathy, the most advanced stage, is characterized by the

growth of new blood vessels onto the retina. Blindness can occur if these new blood vessels contract resulting in a distorted retina or retinal detachment. This is often irreversible. New blood vessels also have a tendency to bleed, adding further complications. (Herman & Greene, 1996)

Diabetic Neuropathy

Diabetes is the most common cause of neuropathy in the United States. Diabetic neuropathy can be defined as peripheral nerve dysfunction that occurs in persons with established diabetes. Diabetic neuropathy causes suffering, disability, and lower extremity amputations. (Herman & Greene, 1996)

Diabetic neuropathy is classified into two groups, these groups are further classified into several types of neuropathies. Each type of neuropathy has specific characteristics, symptoms, and signs. Each syndrome is distinct, however much of the time syndromes appear together making classification difficult. The two main types of diabetic neuropathy are diffuse and focal. The most common type of diffuse neuropathy is distal symmetric sensorimotor polyneuropathy. It is a sensory neuropathy mostly involving the toes and feet. Distal symmetric sensorimotor polyneuropathy can cause acute pain, diminished pain and temperature sensation, or loss of light touch, vibration, and sensation depending on the nerve fibers involved. Another form of diffuse neuropathy is diabetic autonomic neuropathy. Manifestations of diabetic autonomic neuropathy include abnormal sweating, abnormal pupillary function, cardiovascular neuropathy, gastrointestinal neuropathy, constipation, diarrhea, genitourinary neuropathy

affecting bladder and sexual functions, and hypoglycemic unawareness. Focal neuropathy is associated with problems in a single nerve, multiple nerves, the brachial or lumbosacral plexus, or the nerve roots. Studies indicate that 66% of patients with type 1 diabetes have some form of neuropathy. (Herman & Greene, 1996)

Macrovascular Disease

Macrovascular disease is defined as disorders of large vessels with resultant morbidity and mortality. Macrovascular disease manifests as heart disease (myocardial infarction), central nervous system conditions, cerebrovascular accident (CVA, stroke), and lower extremity disease (vascular foot ulcers). (Vinicor, 1996)

Various factors contribute to accelerated and premature macrovascular disease. In the person with diabetes, hyperglycemia has proven to be a factor. Hyperglycemia may place the internal lining of large vessels at risk. Hyperglycemia coupled with hyperlipidemia contributes to atherosclerosis. Metabolic consequences of hyperglycemia include neuropathy which can lead to abnormal cell wall nutrition and sympathetic/parasympathetic denervation. The clotting systems of persons with diabetes have proven to be abnormal including platelet function, blood flow, and blood viscosity. For example, platelets appear sticky and blood flow is sluggish. These abnormalities could increase the likelihood of macrovascular disease. (Vinicor, 1996)

Hypertension is common among persons with diabetes. Family history, a genetic predisposition, and being male are all risk factors that may predispose a person with diabetes to develop hypertension. The administration of insulin therapy may also be a

risk factor. Increased insulin concentrations stimulate sodium reabsorption resulting in fluid retention. Continued investigations are looking into the speculation that insulin may contribute to macrovascular disease. (Vinicor, 1996)

Lower Extremity Problems

Persons with diabetes are at a high risk for lower extremity amputations. In the United States, persons with diabetes constitute 50% of the 100,000 lower extremity amputations performed each year. Poorly controlled diabetes results in lower extremity neuropathy and arteriosclerosis causing lower extremity problems. (Coleman, 1996)

Neuropathy often times results in the loss of touch and pain sensation, the protective senses. Nerve impairment caused from neuropathy and a continuous trauma can lead to ulceration development and infection. Trauma can be caused from high pressure penetrating wounds, such as stepping on a piece of glass or a tack, low pressure pain caused from poorly fitting shoes, or moderate repetitive pressure often times caused from the repetitive stress from walking. The person with diabetes who is insensitive to touch and pain would not feel any of these traumas. Arteriosclerosis compromises circulation in lower extremities caused from partial blockages. These blockages can amplify the trauma because the wound is unable to heal properly. Physicians identifying the development of neuropathy and arteriosclerosis in the lower extremities, educating patients to better care for their diabetes, and teaching patients to properly care for their feet can help prevent lower extremity amputations. (Coleman, 1996)

Diabetes Control and Complications Trial (DCCT) and The ADA's Standards

Diabetes Control and Complications Trial (DCCT)

The Diabetes Control and Complications Trial (DCCT) was the longest and largest prospective study on type 1 diabetes designed to test the theory that the complications associated with diabetes mellitus are related to elevated blood glucose levels. The DCCT was a landmark multicenter trial that followed two groups of patients with type 1 diabetes for an average of 7 years, one group was treated conventionally (goal: clinical well-being, called the standard treatment group) and the other group was treated intensively (goal: normalization of blood glucose, called the intensive treatment group). The intensive treatment group was clearly distinguished from the standard treatment group in terms of hemoglobin A1C values. A glycated hemoglobin test, or hemoglobin A1C, is a clinical laboratory test that is able to measure the average blood glucose level of a patient over a two to three month period. Glycated hemoglobin is a term used to describe a hemoglobin component formed from hemoglobin (oxygen transporting component of erythrocytes) and glucose. The rate of formation of glycated hemoglobin is directly proportional to the ambient glucose concentration in the blood stream. Since erythrocytes (red blood cells) are permeable to glucose, the level of glycated hemoglobin in a blood sample provides a glycemic history of the previous 120 days, the average erythrocyte life span. A normal hemoglobin A1C for a person without diabetes is 4.0-6.0% (70-110 mg/dl). The intensive treatment group's glycated hemoglobin levels averaged 7.2% (155 mg/dl). The standard treatment group's glycated

hemoglobin levels averaged 9.0%. The DCCT results showed a 60% reduction in risk between the intensive treatment group and the standard treatment group in diabetic retinopathy, nephropathy, and neuropathy. The benefit of intensive therapy resulted in the delay in the onset and a major slowing in the progression of these complications. The DCCT demonstrated that there was also no increase in cardiovascular disease in the intensive treatment group. These results were seen in all categories of the intensive treatment group regardless of age, sex, or duration of diabetes. (American Diabetes Association: Clinical Practice Recommendations, 1997)

Goals and Benefits of the Standards of Care

The American Diabetes Association (ADA) believes that the DCCT is both statistically and clinically significant and believes that the primary treatment goal in type 1 diabetes should be blood glucose control at least equal to that achieved in the DCCT intensive treatment group. The ADA has been actively involved in developing standards for care of diabetes mellitus patients for several years. The ADA's goal is to design an intensive treatment program for all patients with diabetes in hopes of paralleling the results of the DCCT. Throughout each year the journal "Diabetes Care" and a few other professional journals publish the ADA's Clinical Practice Recommendations which includes current recommendations for the treatment of patients with diabetes. The ADA strives to serve as a convenient resource for all health-care professionals who care for people with diabetes. Within the health care community the ADA recommendations are considered the gold standard on how to optimally treat patients with diabetes mellitus.

The ADA calls these recommendations the "Standards of Medical Care for Patients With Diabetes Mellitus".

The ADA believes that all patients with diabetes should receive treatment and care from a physician-coordinated team. This team should include a physician, dietitian, nurse, and mental health care professionals with expertise in the management of diabetes. The standards of diabetes care seek to provide physicians and other health care professionals who treat people with diabetes with a means to set treatment goals, assess the quality of diabetes treatment provided, identify areas where more attention or self-management training is needed, and define timely and necessary referral patterns to appropriate specialists. These standards also seek to provide patients with diabetes with a means to assess the quality of medical care they receive, develop expectations for their role in the medical treatment, and compare their treatment outcomes to standard goals. (American Diabetes Association: Clinical Practice Recommendations, 1995; American Diabetes Association: Clinical Practice Recommendations, 1997)

The ADA believes that treatment should be aimed at lowering blood glucose levels to or near normal in all patients. The proven benefits (American Diabetes Association: Clinical Practice Recommendations, 1995; American Diabetes Association: Clinical Practice Recommendations, 1997) of lowering blood glucose levels are as follows:

1. The danger of diabetic ketoacidosis with its accompanying morbidity and mortality is markedly reduced. (p. 8)
2. The symptoms of blurred vision are alleviated and the risk of polyuria,

polydipsia, fatigue, weight loss with polyphagia, and vaginitis may be decreased. (p. 8)

3. The risks of development of progression of diabetic retinopathy, nephropathy, and neuropathy are all greatly decreased. These complications may even be prevented by early normalization of metabolic status. (p. 8)
4. Near normalization of blood glucose has been demonstrated to be associated with less atherogenic lipid profile. (p. 8)

The DCCT has demonstrated that patients with type 1 diabetes reduce their risk of development or progression of retinopathy, nephropathy, and neuropathy by 50-75% with intensive treatment regimens when compared to standard treatments. The desired outcome of glycemic control for the patient with type 1 diabetes is to lower hemoglobin A1C values to achieve maximum prevention from complications. Frequent blood glucose monitoring (at least three to four times per day), nutritional counseling, training in self-management and problem solving, and possible hospitalization for initiation of therapy are all necessary to achieve desired hemoglobin A1C values with intensive treatment programs. (American Diabetes Association: Clinical Practice Recommendations, 1995; American Diabetes Association: Clinical Practice Recommendations, 1997)

Guidelines for the Initial Visit

To help aid health care professionals the ADA offers "initial visit" and "continuing care" guidelines. During the initial visit the physician should obtain a comprehensive medical history from the patient, a complete a physical exam, and laboratory evaluations. The goal of the initial visit is to review previous treatment, evaluate past and present glycemic control, and determine the presence or absence of chronic complications. (American Diabetes Association: Clinical Practice Recommendations, 1995) This information should provide a basis for continuing care.

Guidelines for Continuing Care

Guidelines for continuing care include visitation frequency, changes in medical history, a physical examination, laboratory evaluations, and a reassessment of the management plan. The visitation frequency guideline is defined as regular visits scheduled for insulin-treated patients at least quarterly. The physical exam guidelines are height (until maturity), weight, and blood pressure determinations during every regular visit. The feet should be examined at every regular visit to assess skin condition, sensation, and vascular status. Included in the physical examination guideline is a referral from the diabetes physician for a comprehensive dilated eye and visual examination. The dilated eye and visual exam should be performed annually by an ophthalmologist or optometrist for all patients age 12 and over who have had diabetes for five years, all patients over the age of 30, and any patient with visual symptoms or abnormalities. Laboratory examination guidelines includes a hemoglobin A1C

determination a least quarterly in all insulin-treated patients. Adults should be tested annually for levels of total cholesterol, fasting triglycerides, HDL-cholesterol, and LDL-cholesterol. A lipid profile should be performed on children older than two years after diagnosis of diabetes. If values fall within accepted values, the assessment should be repeated every five years. A routine urinalysis testing for the presence of microalbumin or the albumin/creatinine ratio should be determined annually in postpubertal patients who have had diabetes for five years. Special considerations include nutritional assessment of children and adolescents. A nutritional assessment should be performed at diagnosis and at least annually by a registered dietitian familiar with the nutritional needs of the growing child. The reassessment of the management plan includes determination of progress in meeting goals, individualized nutrition recommendations and instructions by a registered dietitian, control of blood glucose levels, assessment of complications, control of blood pressure, follow-up of referrals, and frequency of hypoglycemia. In addition, the patient's knowledge of diabetes and self-management skills should be reassessed a least annually. Continuing education should be provided preferably by a certified diabetes educator. (American Diabetes Association: Clinical Practice Recommendations, 1995)

The ADA suggests that a complete, organized medical records system is essential to provide ongoing care. Records should always be accessible to the diabetes treatment team and organized so that they document the occurrence of the ADA guidelines and serve as a reminder of what should be done for the patient at the appropriate intervals. (American Diabetes Association: Clinical Practice Recommendations, 1995)

CHAPTER 3

Methods

The ADA Chart Review for Patients with Type 1 Diabetes

The data collected for this study were obtained through the review of medical charts of patients with type 1 diabetes. The specific data obtained was divided into two parts, 1) physician compliance with components of the ADA's continuing care guidelines as one measure of quality of physician care, and 2) patient information to assess specific epidemiological patterns of patients with type 1 diabetes.

Information regarding compliance with the 1995/1996 ADA's "Standards of Medical Care for Patients with Diabetes Mellitus" included documentation of:

1. Visitation Frequency - regular visits should be scheduled for insulin-treated patients at least quarterly (four times/year), depending on achievement of treatment goals.
2. Blood Pressure Check - performed at every regular diabetic visit (four times/year).
3. Weight Check - performed at every regular diabetic visit (four times/year).
4. Height Check - performed at every regular diabetic visit until maturity (four times/year).
5. Foot Examination - performed at every regular diabetic visit to assess vascular status, skin condition, and sensation (four times/year).

6. Hemoglobin A1C - determination should be performed at least quarterly in all insulin-treated patients (four times per year).
7. Lipid Profile - adults with abnormal lipid profiles should be tested annually for total cholesterol, fasting triglycerides, HDL-cholesterol, and LDL-cholesterol (once per year). A lipid profile should be performed on children older than two years who have been diagnosed with type 1 diabetes. A repeat assessment should be performed every five years if values are normal.
8. Microalbumin/Creatinine Clearance - performed annually for adults and in postpubertal patients who have had diabetes for five years (once per year).
9. Dilated Eye Referral - physicians should refer all patients with type 1 diabetes patients over the age of 30 years and all patients age 12 and over who have had diabetes for five years to complete a comprehensive dilated eye and visual examination annually by an ophthalmologist or optometrist (once per year).
10. Registered Dietitian Referral - physicians should refer all children with type 1 diabetes for a nutritional assessment by an individual experienced with the nutritional needs of a growing child, preferably a registered dietitian at least annually (once per year).

11. Nurse Educator Referral - knowledge of diabetes and self-management skills should be reassessed a least annually preferably by a Certified Diabetes Educator (once per year).

Patient information collected for research and epidemiological purposes included:

1. The patient's physician.
2. The patient's birth date.
3. The patient's sex.
4. The date the patient was first seen at the clinic.
5. The age the patient was diagnosed with type 1 diabetes.

The participating clinic's Medical Record's computerized inventory was used to provide a list of all patients with type 1 diabetes receiving care at the participating clinic. The computer compiled the list by selecting every patient with a code of 250.01 indicating a patient with type 1 diabetes. The physicians at the participating clinic estimated that they treat 200-300 patients with type 1 diabetes. However, the computerized inventory provided a list of 1150 medical chart numbers which included all patients coded with the number of 250.01. Such a large number of patients with type 1 diabetes being treated at a clinic in a relatively small community would be improbable according to the documented prevalence of the disease in the United States. The study had revealed a problem with the coding system of patients with diabetes. Similarity between the codes for patients with type 1 (250.01) and type 2 (250.00) diabetes proved to be one cause of the problem; another cause was apparent unfamiliarity of the differences between type 1 and type 2 diabetes. Some patient charts indicated several

exchanges between the codes for an individual patient; a medical impossibility. The largest cause of the problem was patients with type 2 diabetes (250.00) beginning insulin therapy. Many patients were coded 250.01 because of their insulin therapy status, regardless of the patient's type of diabetes. In efforts to rectify the problem, meetings were initiated by the nurse educator to clarify the definition of each code and explain the problem. In regards to the study, all 1150 charts were reviewed to determine if the patient had type 1 or type 2 diabetes. The criteria used to determine if the patient had type 1 diabetes were: diagnosis of the patient with diabetes before the age of 40 years and/or initiation of insulin therapy within the first year of diagnosis. (American Diabetes Association: Clinical Practice Recommendations, 1995)

The participating clinic's name, the physician's name and medical charts were kept confidential. All patients' charts were reviewed at the participating clinic's various facilities. At no time did any of the patient files leave the facilities of the participating clinic. The researcher signed a waiver to keep all data and the name of the participating clinic, physician's names, and patient's names confidential. Random numbers were assigned to all physicians and patient's files participating in the study. The lists identifying the random numbers with the physician's and patient's file numbers were kept separately from the data. Data were stored in a locked briefcase. The University of Montana's IRB Review Board approved this project on November 17, 1997. A consent form was signed by all participating physicians. Every physician signed the consent form agreeing to the use of his/her data in aggregate form.

Assessment Tool Design for Physician Compliance to The ADA's Standards

The purpose of the assessment tool was to indicate physician compliance with the ADA's Standards of Care to patients with type 1 diabetes for the years of 1995 and 1996. The retrospective assessment tool was designed to provide the information needed in a one-page format to simplify data collection and to allow each page to indicate one patient's two year history. In addition, such an assessment tool was needed to address the complexities of recording extremely detailed information. Some of these complexities the assessment tool needed to address included the need to:

1. Record epidemiological data relevant to the patient.
2. Be able to reflect a time of reference to track if and when ADA Standards were being met. A time of reference would also indicate if the physician was following the ADA's suggested time frame for the various standards.
3. Document when a patient was being treated by another physician.
4. Distinguish a difference between completed laboratory tests and verbal requests made by the physician for the patient to obtain laboratory tests.
5. Document examinations performed by the physician during a single visit.
6. Document when the patient was seen for a diabetic visit as opposed to a non-diabetic visit.
7. Document hemoglobin A1C values for the patient.

As shown in Figure 1, the retrospective assessment tool designed for this project addressed each of these complexities.

Patient's ID # _____ DOB _____ Physician's ID # _____

Age of Diagnosis _____ Current Age/Sex _____ Date Pt First Seen _____

JAN 95 (1)	FEB 95 (2)	MAR 95 (3)	APR 95 (4)	MAY 95 (5)	JUNE 95 (6)	JULY 95 (7)	AUG 95 (8)	SEPT 95 (9)	OCT 95 (10)	NOV 95 (11)	DEC 95 (12)

JAN 96 (1)	FEB 96 (2)	MAR 96 (3)	APR 96 (4)	MAY 96 (5)	JUNE 96 (6)	JULY 96 (7)	AUG 96 (8)	SEPT 96 (9)	OCT 96 (10)	NOV 96 (11)	DEC 96 (12)

KEY

✔ = Diabetes Visit, X = Visit Unrelated to Diabetes, O = Patient Seen by Another Physician, BP = Blood Pressure Measurement, W = Weight Measurement, H = Height Measurement, F = Foot Examination L = Lipid Profile, A = Hemoglobin A1c, M = Microalbumin, C = Creatine Clearance, E = Dilated Eye Referral, D = Dietitian Referral, N = Nurse Educator Referral

# of "X" from Jan 95 - Dec 96			CRITERIA :
	'95	'96	% Met:
___	__	__	Visits with Diabetes Physician
___	__	__	Lipid Profiles (labs/request)
___	__	__	Hemoglobin A1C (labs/request)
___	__	__	Microalbumin/Creatine Clearance (labs/request)
___	__	__	Dilated Eye Referrals
___	__	__	Registered Dietitian Referrals
___	__	__	Nurse Educator Referrals
___	__	__	Foot Examinations
___	__	__	Blood Pressure Measurements
___	__	__	Weight Measurements
___	__	__	Height Measurements (until maturity)

_____ Visitation - 4 times per year

_____ Lipid Profile - Yearly (Child - after age 2 yrs, repeat every 5 yrs if normal)

_____ Hemoglobin A1c - Quarterly (every 3 months)

_____ Microalbumin/Creatine Clearance – Yearly - post-pubertal patient who has had diabetes for 5 Yrs

_____ Dilated Eye Referral - Yearly for pt over 12 yrs who has had diabetes for 5 years, all pts over 30 yrs

_____ Registered Dietitian Referral (Child – Yearly)

_____ Nurse Educator Referral

_____ Foot Examination - Every Regular Visit

_____ Blood Pressure Measurements - Every Regular Visit

_____ Weight Measurements - Every Regular Visit

_____ Height Measurements (until maturity) – Every Regular Visit

Comments:

Figure 1. Retrospective assessment tool designed to assess physician compliance to the ADA Standards.

The top section of the assessment tool allows for epidemiological data to be recorded for each patient with type 1 diabetes. The middle section of the assessment tool makes it possible to record detailed information regarding each visit by using the key provided. In addition, the middle section of the assessment tool provides a frame of reference by allowing information to be recorded on a month to month basis. The lines provided below each month indicate a single visit; the key is used to record what occurred during the visit. The key also addresses the issues of a diabetes related visit versus a non-diabetes related visit, when the patient was being treated by another physician, and the difference between a completed lab test and a verbal request. The bottom section of the assessment tool allows for the frequency and percent values of each of the ADA Standards to be recorded for 1995 and 1996.

Statistical Analysis of Data

Measures of central tendency and frequencies were used to assess physician compliance to the ADA's Standards. Aggregate data were used to demonstrate how effective the main clinic and the satellite clinics were at meeting these standards for 1995 and 1996.

The data collected on physician compliance with the ADA's Standards of Care were analyzed accordingly:

1. Measures of central tendency and percents were determined using aggregate data for physician compliance with each ADA Standard. This information is provided for the main clinic and the satellite clinics.

2. Mean hemoglobin A1C values were determined for the main clinic and satellite clinics.

Several comparisons were made from the statistical analysis of data. Some demographic comparisons were made among physicians regarding physician gender and the number of patients with type 1 diabetes each physician treated in 1995 and 1996. The comparisons included:

1. Comparisons were made between the main clinic and the satellite clinics' physician compliance with the ADA Standards using measures of central tendency and percents for each ADA Standard.
2. Comparisons were made between physician compliance to the ADA Standards for children and adult patients with type 1 diabetes using measures of central tendency and percents for each ADA Standard at the main clinic and satellite clinics.
3. Comparisons were made between male and female physicians' compliance to the ADA Standards using measures of central tendency and percents for each ADA Standard at the main clinic. This comparison was not performed at the satellite clinics because all physicians were male.
4. Comparisons were made between physicians treating 10 or more patients with type 1 diabetes and physicians treating fewer than 10 patients with type 1 diabetes using measures of central tendency and percents for each ADA Standard at the main clinic. This comparison was not performed at the satellite clinics because all physicians treated fewer than four patients.

5. All sample groups' mean hemoglobin A1C values were compared to the ADA and DCCT recommended mean hemoglobin A1C value of 7.2%.
6. Comparisons were made between each sample group's mean hemoglobin A1C values and physician compliance to the visitation frequency standard and the hemoglobin A1C determination standard. These two standards are essential for optimal quality care. The visitation frequency standard allows a physician to develop a relationship with the patient; making the physician more accountable for that patient. The hemoglobin A1C determination standard is the only laboratory test that is diabetes specific. The frequency of the hemoglobin A1C laboratory test allows the physician to ascertain the patient's diabetes status and also gives the physician a reason to take a more active role in the care of their patient. Higher compliance with ADA Standards may favorably influence hemoglobin A1C values.

Mean values are provided for the epidemiological data collected on the patients with type 1 diabetes at the participating clinic. These included:

1. Age - This information was compared to the average age of patients with type 1 diabetes in the United States
2. Age of onset - This information was compared to the average age of onset for patients with type 1 diabetes in the United States.
3. Duration of type 1 diabetes - This information was compared to the national average of the duration of type 1 diabetes.

4. Sex - This information was compared to the percent of male and female patients with type 1 diabetes in the United States.

CHAPTER 4

Results

Description of Sample - Main Clinic and Satellite Clinics

Nineteen physicians treated the population of patients with type 1 diabetes at the main clinic. Twelve physicians treated adult patients with type 1 diabetes, five physicians treated children with type 1 diabetes (less than age 18), and two treated a combination of adults and children. Each main clinic physician treated a varying number of patients with type 1 diabetes ranging from 1 to 43 patients. Sixteen of these physicians treated fewer than 10 patients with type 1 diabetes and three physicians treated 10 or more patients with type 1 diabetes. Seven of the main clinic's physicians included in the study are female; twelve are male.

The satellite clinics included nine physicians having treated a small population of patients with type 1 diabetes. Five of these physicians treated adult patients with type 1 diabetes, one physician treated children with type 1 diabetes, and three treated a combination of adults and children. The greatest number of patients with type 1 diabetes treated by one satellite clinic physician was four, with the majority of physicians having treated one patient with type 1 diabetes. All of the satellite physicians included in this study were male.

Sample groups included:

1. Main Clinic :

   19 physicians treated the population of patients with type 1 diabetes at the main clinic which included 107 medical charts in 1995 and 122 medical charts in 1996.

2. Care Provided to Adults with Type 1 Diabetes - Main Clinic :

   14 physicians treated adults with type 1 diabetes at the main clinic which included 91 medical charts in 1995 and 104 medical charts in 1996 (12 physicians treated only adults with type 1 diabetes; two treated adults and children with type 1 diabetes).

3. Care Provided to Children with Type 1 Diabetes - Main Clinic :

   Seven physicians treated the children with type 1 diabetes at the main clinic which included 16 medical charts in 1995 and 18 medical charts in 1996 (five physicians treated only children with type 1 diabetes; two treated adults and children with type 1 diabetes).

4. Female Physicians - Main Clinic :

   Seven female physicians treated a segment of the patients with type 1 diabetes at the main clinic which included 17 medical charts in 1995 and 20 medical charts in 1996.

5. Male Physicians - Main Clinic :

   12 male physicians treated a segment of the patients with type 1 diabetes at the main clinic which included 90 medical charts in 1995 and 102 medical charts in 1996.

6. Physicians Treating 10 or More Patients with Type 1 Diabetes - Main Clinic :

   Three physicians treated 10 or more patients with type 1 diabetes at the main clinic which included 74 medical charts in 1995 and 83 medical charts in 1996.

7. Physicians Treating Fewer Than 10 Patients with Type 1 Diabetes - Main Clinic :

   16 physicians treated fewer than 10 patients with type 1 diabetes at the main clinic which included 33 medical charts in 1995 and 39 medical charts in 1996.

8. Satellite Clinics :

   Nine physicians at both Satellite Clinics treated the population of patients with type 1 diabetes treated at the satellite clinics which included 15 medical charts in 1995 and 16 medical charts in 1996.

9. Care Provided to Adults with Type 1 Diabetes - Satellite Clinics :

   Eight physicians treated the adults with type 1 diabetes at the satellite clinics which included 11 medical charts in 1995 and 12 medical charts in 1996 (five physicians treated only adults with type 1 diabetes; three treated adults and children with type 1 diabetes).

10. Care Provided to Children with Type 1 Diabetes - Satellite Clinics :

    Four physicians treated the children with type 1 diabetes at the satellite clinics which included four medical charts in 1995 and four medical charts in 1996 (one physician treated only children with type 1 diabetes; three treated adults and children with type 1 diabetes).

The number of charts analyzed varied according to the specific requirements of certain ADA Standards. For example, the requirement for a dilated eye referral is all patients with type 1 diabetes older than 12 years whom have had diabetes for five years, and all patients older than 30 years. Those physicians whose patients' charts did not meet these requirements were exempt from the dilated eye referral standard. The ADA

Standards that have unique requirements are height measurement, lipid profile, dilated eye referral , microalbumin/creatinine clearance referrals, and dietitian referrals. Each medical chart of a patient with type 1 diabetes was considered for these unique requirements for 1995 and 1996. Complete analysis of the data is located in Appendixes A through V. A short summary of the data analysis is provided in the following sections for each ADA Standard.

Visitation Frequency

Physicians treating more than 10 patients with type 1 diabetes had the highest compliance to the visitation frequency standard at 44.6% in 1995 (see Table 1). All other physician sample groups had lower compliance to the visitation standard, with physicians treating children with type 1 diabetes at the satellite clinics having the lowest compliance at 0.0% in 1996. Mode values for all sample groups, not including adults treated at the satellite clinics in 1995 (bimodal=1 and 3) or children treated at the main clinic in 1996 (mode=2), were 0 and/or 1.

Table 1

1995/1996 Visitation Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	107	1	41.1	122	1	36.9
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	1	44.0	104	1	39.4
Main Clinic - Child Patients w/ Type 1 Diabetes	16	1	26.7	18	2	22.2
Main Clinic - Female Physicians	17	0 and 1	23.5	20	1	40.0
Main Clinic - Male Physicians	90	1	44.4	102	1	36.3
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	74	1	44.6	83	1	39.8
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	33	1	33.3	39	1	30.8
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	15	0 and 1	26.7	16	0	12.5
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	1 and 3	27.3	12	0	16.7
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	25.0	4	1	0.0

Blood Pressure Measurement Standard

Physicians treating more than 10 patients with type 1 diabetes had the highest compliance to the blood pressure measurement standard at 40.5% in 1995 (see Table 2). Physicians treating children with type 1 diabetes at the satellite clinics in 1995 and 1996 and the main clinic in 1996 had the lowest compliance to the blood pressure measurement standard at 0.0%. All physician sample groups treating patients at the main clinic (1995 and 1996) and physicians treating adults at the satellite clinics in 1995 had a mode of 1. The remaining satellite sample groups had a mode of 0.

Table 2

1995/1996 Blood Pressure Measurement Standard Results

Sample Group	1995			1996		
	# of charts	Mode	% meeting/ exceeding Standard	# of charts	Mode	% meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	107	1	34.6	122	1	29.5
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	1	39.6	104	1	34.6
Main Clinic - Child Patients w/ Type 1 Diabetes	16	1	6.3	18	1	0.0
Main Clinic - Female Physicians	17	1	23.5	20	1	25.0
Main Clinic - Male Physicians	90	1	36.7	102	1	30.4
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	74	1	40.5	83	1	34.9
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	33	1	21.2	39	1	17.9
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	15	0	20.0	16	0	6.3
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	1	27.3	12	0	8.3
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	0.0

Weight Measurement Standard

Physicians treating more than 10 patients with type 1 diabetes had the highest compliance to the weight measurement standard at 35.1% in 1995 (see Table 3). All other physician sample groups had a lower compliance, with the physicians treating children at the satellite clinics having the lowest compliance at 0.0% in 1995 and 1996. In 1995 and 1996 modes for all sample groups, not including all satellite sample groups (mode=0) and female physicians (bimodal=0 and 1, 1995 only), were 1.

Table 3

1995/1996 Weight Measurement Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	107	1	30.8	122	1	28.7
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	1	34.1	104	1	32.7
Main Clinic - Child Patients w/ Type 1 Diabetes	16	1	12.5	18	1	5.6
Main Clinic - Female Physicians	17	0 and 1	23.5	20	1	20.0
Main Clinic - Male Physicians	90	1	32.2	102	1	30.4
Main Clinic - Physicians Treating > 10 Patients w/ type 1 Diabetes	74	1	35.1	83	1	33.7
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	33	1	21.2	39	1	17.9
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	15	0	13.3	16	0	6.3
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	18.2	12	0	8.3
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	0.0

Height Measurement Standard

The ADA recommendation for the height measurement standard was not met by any of the sample groups in 1995 and 1996 (see Table 4). Only physicians treating children with type 1 diabetes were accountable for this standard due to the ADA stipulation "until the age of maturity." Mode value was 0 in most sample groups with the exceptions of female physician (mode=1) in 1995, physicians treating more than 10 patients with type 1 diabetes (mode=1) in 1995, and physicians treating fewer than 10 patients with type 1 diabetes (bimodal=0 and 1) in 1996.

Table 4

1995/1996 Height Measurement Standard Results

Sample Group	1995			1996		
	# of charts	Mode	% meeting/ exceeding Standard	# of charts	Mode	% meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	16	0	0.0	20	0	0.0
Main Clinic - Adult Patients w/ Type 1 Diabetes	n/a	n/a	n/a	n/a	n/a	n/a
Main Clinic - Child Patients w/ Type 1 Diabetes	16	0	0.0	18	0	0.0
Main Clinic - Female Physicians	6	1	0.0	7	0	0.0
Main Clinic - Male Physicians	10	0	0.0	13	0	0.0
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	1	1	0.0	3	0	0.0
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	15	0	0.0	17	0 and 1	0.0
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	4	0	0.0	4	0	0.0
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	n/a	n/a	n/a	n/a	n/a	n/a
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	0.0

Foot Examination Standard

Physicians treating fewer than 10 patients with type 1 diabetes had the highest compliance to the foot examination standard at 6.1% in 1995 (see Table 5). All other physician sample groups had lower compliance. A virtual lack of compliance was seen in five of the sample groups in 1995 and four sample groups in 1996. Most sample groups had mode values of 0, exceptions included 1996 results for the main clinic, physicians treating adults at the main clinic, male physicians, and physicians treating more than 10 patients with type 1 diabetes with a mode value of 1.

Table 5

1995/1996 Foot Examination Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	107	0	3.7	122	1	3.3
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	0	4.4	104	1	3.8
Main Clinic - Child Patients w/ Type 1 Diabetes	16	0	0.0	18	0	0.0
Main Clinic - Female Physicians	17	0	0.0	20	0	5.0
Main Clinic - Male Physicians	90	0	4.4	102	1	2.9
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes						
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	33	0	6.1	39	0	2.6
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	74	0	8.0	98	0	8.6
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	0.0	12	0	0.0
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	0.0

Hemoglobin A1C Determination Standard

Physicians treating more than 10 patients with type 1 diabetes had the highest compliance to the hemoglobin A1C determination standard at 15.7% in 1996 (see Table 6). All other physician sample groups had lower compliance to the hemoglobin A1C determination standard. The physician sample groups at the satellite clinics in 1995 and 1996 and the children treated at the main clinic in 1995 had the lowest compliance to the hemoglobin A1C determination standard at 0.0%. Most sample groups had a mode value of 1 with the exceptions of all satellite clinics with a mode value of 0 and physicians treating children with a bimodal result of 1 and 2.

Table 6

1995/1996 Hemoglobin A1C Determination Standard Results

Sample Group	1995			1996		
	# of charts	Mode	% meeting/ exceeding Standard	# of charts	Mode	% meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	107	1	8.4	122	1	13.1
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	1	9.9	104	1	14.4
Main Clinic - Child Patients w/ Type 1 Diabetes	16	1 and 2	0.0	18	1	5.6
Main Clinic - Female Physicians	17	1	5.9	20	1	5.0
Main Clinic - Male Physicians	90	1	8.9	102	1	14.7
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	74	1	8.1	83	1	15.7
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	33	1	9.1	39	1	7.7
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	15	0	0.0	16	0	0.0
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	0.0	12	0	0.0
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	0.0

Lipid Profile Standard

Compliance with the lipid profile standard was met at a greater percentage than all other standards (see Table 7). The ADA recommends a lipid profile annually for all adult patients with type 1 diabetes who have abnormal lipid profiles. Physicians treating fewer than 10 patients with type 1 diabetes had the highest compliance with the lipid profile standard at 81.0% in 1996. All other physician sample groups had a lower compliance to the lipid profile standard with the physicians at the satellite clinics in 1996 having had the lowest compliance at 33.3%. High compliance with this standard was verified with a mode value of 1 for most sample groups with the exception of the satellite clinics and the female physicians in 1995 with a mode value of 0. Physicians treating children with type 1 diabetes were not accountable for the lipid profile standard due to the ADA stipulation "if normal, an assessment should be repeated in five years."

Table 7

1995/1996 Lipid Profile Determination Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	91	1	67.0	101	1	70.3
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	1	67.0	101	1	70.3
Main Clinic - Child Patients w/ Type 1 Diabetes	n/a	n/a	n/a	n/a	n/a	n/a
Main Clinic - Female Physicians	11	0	45.5	12	1	75.0
Main Clinic - Male Physicians	80	1	68.8	89	1	68.5
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	73	1	69.9	80	1	68.8
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	18	0	55.6	21	1	81.0
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	11	0	36.4	12	0	33.3
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	36.4	12	0	33.3
Satellite Clinics - Child Patients w/ Type 1 Diabetes	n/a	n/a	n/a	n/a	n/a	n/a

Microalbumin/Creatinine Clearance Determination Standard

Physicians treating more than 10 patients with type 1 diabetes had the highest compliance with the microalbumin/creatinine clearance determination standard at 68.8% in 1996 (see Table 8). All other physician sample groups had lower compliance results. The 1995 results for all satellite clinics sample groups and physicians treating children at the satellite clinics in 1996 had the lowest compliance to the microalbumin/creatinine clearance standard at 0.0%. Most sample groups had a mode value of 0 for 1995 and 1996. The exceptions were 1996 results for the main clinic, physicians treating adults, male physicians, and physicians treating more than 10 patients with type 1 diabetes with a mode value of 1.

Table 8

1995/1996 Microalbumin/Creatinine Clearance Determination Standard Results

Sample Group	1995			1996		
	# of charts	Mode	% meeting/ exceeding Standard	# of charts	Mode	% meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	91	0	51.6	103	1	63.1
Main Clinic - Adult Patients w/ Type 1 Diabetes	86	0	52.3	99	1	64.6
Main Clinic - Child Patients w/ Type 1 Diabetes	5	0	40.0	4	0	25.0
Main Clinic - Female Physicians	12	0	41.7	13	0	53.8
Main Clinic - Male Physicians	79	0	53.2	90	1	64.4
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	70	0	52.9	77	1	68.8
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	21	0	47.6	26	0	46.2
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	12	0	0.0	13	0	23.1
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	0.0	12	0	25.0
Satellite Clinics - Child Patients w/ Type 1 Diabetes	1	0	0.0	1	0	0.0

Dilated Eye Referral Standard

Physician compliance to the dilated eye referral standard (see Table 9) ranged from 66.7% in 1995 for physicians treating children with type 1 diabetes to 0.0% for physicians treating children at the satellite clinics (1995) and all satellite clinics' sample groups (1996). Mode value for all sample groups, not including physicians treating children with type 1 diabetes at the main clinic (mode=1), was 0.

Table 9

1995/1996 Dilated Eye Referral Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	94	0	45.7	107	0	44.9
Main Clinic - Adult Patients w/ Type 1 Diabetes	88	0	44.3	99	0	46.5
Main Clinic - Child Patients w/ Type 1 Diabetes	6	1	66.7	8	0	25.0
Main Clinic - Female Physicians	13	0	30.8	15	0	46.7
Main Clinic - Male Physicians	81	0	48.1	92	0	44.6
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	70	0	45.7	77	0	48.1
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	24	0	45.8	30	0	36.7
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	12	0	16.7	13	0	0.0
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	18.2	12	0	0.0
Satellite Clinics - Child Patients w/ Type 1 Diabetes	1	0	0.0	2	0	0.0

Dietitian Referral Standard

In 1996 higher compliance was demonstrated in physicians treating more than 10 patients with type 1 diabetes and physicians treating adult patients at the main clinic, however, it must be noted these results only included one medical chart (see Table 10). All other physician sample groups had lower compliance to the dietitian referral standard with three sample groups in 1995 having 0.0% compliance. All mode values in 1995 were 0. Mode values varied in 1996 from 0, 2, 0 and 2, and 7.

Table 10

1995/1996 Dietitian Referral Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	16	0	43.8	19	0	73.7
Main Clinic - Adult Patients w/ Type 1 Diabetes	n/a	n/a	n/a	1	7	100.0
Main Clinic - Child Patients w/ Type 1 Diabetes	16	0	43.8	18	0	72.2
Main Clinic - Female Physicians	6	0	66.7	7	2	71.4
Main Clinic - Male Physicians	10	0	30.0	12	0 and 2	75.0
Main Clinic - Physicians Treating >10 Patients w/ Type 1 Diabetes	1	0	0.0	1	7	100.0
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	15	0	46.7	17	0 and 2	76.5
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	4	0	0.0	4	0	25.0
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	n/a	n/a	n/a	n/a	n/a	n/a
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	25.0

Nurse Educator Referral Standard

Female physicians had the highest compliance to the nurse educator referral standard at 50.0% in 1996 (see Table 11). All other physician sample groups had lower compliance results. Satellite physician sample groups in 1995 had the lowest compliance to the nurse educator referral standard at 0.0%. Mode value for all sample groups was 0.

Table 11

1995/1996 Nurse Educator Referral Standard Results

Sample Group	1995 # of charts	1995 Mode	1995 % meeting/ exceeding Standard	1996 # of charts	1996 Mode	1996 % meeting/ exceeding Standard
Main Clinic Results - All Patients w/ Type 1 Diabetes	107	0	15.0	122	0	36.1
Main Clinic - Adult Patients w/ Type 1 Diabetes	91	0	11.0	104	0	31.7
Main Clinic - Child Patients w/ Type 1 Diabetes	16	0	37.5	18	0	61.1
Main Clinic - Female Physicians	17	0	47.1	20	0	50.0
Main Clinic - Male Physicians	90	0	8.9	102	0	34.3
Main Clinic - Physicians Treating >10 Patients w/ type 1 Diabetes	74	0	8.1	83	0	36.1
Main Clinic - Physicians Treating <10 Patients w/ Type 1 Diabetes	33	0	30.3	39	0	38.5
Satellite Clinics' Results - All Patients w/ Type 1 Diabetes	16	0	0.0	16	0	12.5
Satellite Clinics - Adult Patients w/ Type 1 Diabetes	11	0	0.0	12	0	8.3
Satellite Clinics - Child Patients w/ Type 1 Diabetes	4	0	0.0	4	0	25.0

Hemoglobin A1C Results

Results for 1995

Normal hemoglobin A1C values range from 4.0-6.0%. The DCCT has shown a delay in the onset and a major slowing in the progression of long-term complications with a mean hemoglobin A1C value of 7.2%. The mean hemoglobin A1C value for the main clinic, including all physicians, was 8.4%. Mean hemoglobin A1C values for adults with type 1 diabetes and children with type 1 diabetes were 8.3% and 8.9%, respectively. Male physician mean hemoglobin A1C value and female physician mean hemoglobin A1C value were 8.5% and 7.4%, respectively. Mean hemoglobin A1C values for physicians treating more than 10 patients with type 1 diabetes and physicians treating fewer than 10 patients with type 1 diabetes were 8.5% and 8.1%, respectively. The mean hemoglobin A1C value for the satellite clinic, including all physicians was 7.9%.

Satellite adults with type 1 diabetes mean hemoglobin A1C was 7.9%, a mean hemoglobin for children with type 1 diabetes was not available due to lack of laboratory analysis. (See Appendix U for a complete analysis.)

Results for 1996

The mean hemoglobin A1C value for the main clinic, including all physicians was 8.7%. Mean hemoglobin A1C values for adults with type 1 diabetes and children with type 1 diabetes were 8.6% and 9.7% respectively. Male physician mean hemoglobin A1C value and female physician mean hemoglobin A1C value were 8.8% and 8.1%, respectively. Mean hemoglobin A1C values for physicians treating more than 10 patients with type 1 diabetes and physicians treating fewer than 10 patients with type 1 diabetes were 8.7% and 8.6%, respectively. The mean hemoglobin A1C value for the satellite clinic, including all physicians was 9.7%. Mean hemoglobin for satellite adults with type 1 diabetes and satellite children with type 1 diabetes was 9.8% and 9.5, respectively. (See Appendix U for a complete analysis.)

Epidemiological Results

Cowie and Harris reported the median age among persons with type 1 diabetes in the United States older than 18 is 32 years. A study performed in Allegheny County, PA between the years of 1965-89 showed an age range of 0-44 years among persons with type 1 diabetes with most patients with type 1 diabetes between the ages of 25-29. (Cowie & Harris, 1995) The average age of adults with type 1 diabetes at the main clinic and satellite clinics was 41.19 years (42.92 years - main clinic, 45.50 years - satellite

clinics). The average age of children with type 1 diabetes at the main clinic and satellite clinics was 12.86 years (13.11 years - main clinic, 11.75 years - satellite clinics). The average age of the entire sample of patients with type 1 diabetes at the main clinic and satellite clinics was 36.77 years (36.74 years - main clinic, 37.06 years - satellite clinics). (See Appendix V for a complete analysis.)

In the United States onset of type 1 diabetes is most frequent at age 10-14 years, during the pubertal peak. (Cowie & Harris, 1995; LaPorte, 1995) The average age of onset for patients with type 1 diabetes at the main clinic and satellite clinics was 16.48 years (16.36 years - main clinic, 17.57 years - satellite clinics). The average age of onset for children at the main clinic and satellite clinics was 6.64 years (7.00 years - main clinic, 5.00 years - satellite clinics). The average age of onset for adults at the main clinic and satellite clinics was 18.42 years (18.01 years - main clinic, 27.10 years - satellite clinics). (See Appendix W for a complete analysis.)

Studies performed in Allegheny County, PA showed that duration (the length of time a patient has had type 1 diabetes) of type 1 diabetes is evenly distributed between 0-24 years. (Cowie & Harris, 1995) The average duration of type 1 diabetes for the type 1 diabetes patient sample at the main clinic and satellite clinics was 19.99 years (20.25 years - main clinic, 17.79 years - satellite clinics). The average duration of type 1 diabetes for children at the main clinic and satellite clinics was 6.23 years (6.11 years - main clinic, 6.75 years - satellite clinics). The average duration of type 1 diabetes for adults at the main clinic and satellite clinics was 22.70 years (22.75 years - main clinic, 22.20 years - satellite clinics). (See Appendix X for a complete analysis.)

In the United States studies indicate that there are slightly more white males (53.4%) older than 18 with type 1 diabetes than white females (46.6%) older than 18. (Haire-Joshu, 1996) The percent of male/female patients with type 1 diabetes at the main clinic and satellite clinics was 55.3% (n = 78) male and 44.4% (n = 63) female. The percent of male/female patients with type 1 diabetes at the main clinic was 53.6% (n = 67) male and 45.4% (n = 58) female. The percent of male/female patients with type 1 diabetes at satellite clinics was 68.8% (n = 11) male and 31.2% (n = 5) female. The percent of male/female children with type 1 diabetes at the main clinic and satellite clinics was 72.7% (n = 16) male and 27.3% (n = 6) female. The percent of male/female children with type 1 diabetes at the main clinic was 66.7% (n = 12) male and 33.3% (n = 6) female. The percent of male/female children with type 1 diabetes at satellite clinics is 100% (n = 4) male and 0.0% (n = 0) female. The percent of male/female adults with type 1 diabetes at the main clinic and satellite clinics was 52.1% (n = 62) male and 47.9% (n = 57) female. The percent of male/female adults with type 1 diabetes at the main clinic was 51.4% (n = 55) male and 48.6% (n = 52) female. The percent of male/female adults with type 1 diabetes at satellite clinics was 58.3% (n = 7) male and 41.7% (n = 5) female. (See Appendix U for a complete analysis.)

CHAPTER 5

Discussion and Recommendations

Discussion

Effectiveness of the Assessment Tool

The assessment tool designed for this project allowed the researcher to collect accurate and detailed information from charts of patients with type 1 diabetes. Using a time line made it visually possible to ascertain if a patient was receiving optimal or less than optimal care as shown in Table 12 and Table 13. The key made it possible to accurately state in specific detail physicians' compliance to the ADA Standards.

Table 12

Example of Optimal Care

Jan (1)	Feb (2)	Mar (3)	Apr (4)	May (5)	June (6)	July (7)	Aug (8)	Sep (9)	Oct (10)	Nov (11)	Dec (12)
	✓ BP W F E			✓ BP W F N			✓ BP W F			✓ BP W F	
	A			AML			A			A	

Key : b= Diabetic Visit, X = Visit Unrelated to Diabetes, O = Patient Seen by Other Physician, L= Lipid Profile, A = Hemoglobin A1C, M = Microalbumin, C = Creatinine Clearance, E = Dilated Eye Referral, D = Dietitian Referral, N = Nurse Educator Referral, F = Foot Exam, BP = Blood Pressure Measurement, W = Weight Measurement, H= Height Measurement

Table 13

Example of Less than Optimal Care

Jan (1)	Feb (2)	Mar (3)	Apr (4)	May (5)	June (6)	July (7)	Aug (8)	Sep (9)	Oct (10)	Nov (11)	Dec (12)
			✓BP				X BP W			X W F	

Key : ✓ = Diabetic Visit, X = Visit Unrelated to Diabetes, O = Patient Seen by Other Physician, L= Lipid Profile, A = Hemoglobin A1C, M = Microalbumin, C = Creatinine Clearance, E = Dilated Eye Referral, D = Dietitian Referral, N = Nurse Educator Referral, F = Foot Exam, BP = Blood Pressure Measurement, W = Weight Measurement, H= Height Measurement

In addition, the assessment tool allowed the researcher to count the frequency adherence of each standard and to represent in percentage form physicians' compliance to the ADA Standards. The comment section of the assessment tool proved to be valuable because it allowed important information to be recorded such as hemoglobin A1C values and compliance problems with patients. One measure of effectiveness was demonstrated with the detailed analyses of the data (Appendices A-X). Further verification could be shown with physician use.

Impact of the Visitation Frequency Standard

The researcher determined that the visitation frequency standard is the key to physician compliance to all other standards. Simply stated, the ADA Standards cannot be performed for a patient with type 1 diabetes if the patient is not seen at the clinic for an appointment. Blood pressure, weight and height measurements, and foot examinations are all standards performed during the type 1 diabetic visit. These

standards are controlled by patient visitation frequency. Analysis of the data showed these standards could only be met up to the percentage value for the visitation standard. Despite the control of the visitation standard, the data indicated for the majority of sample groups blood pressure, weight, height, and foot examinations were met at a lower percentage than the visitation frequency standard. This demonstrates that blood pressure, weight, height, and foot examinations were not performed during all patient visits. In all sample groups, higher compliance to the blood pressure measurement and weight measurement standards were seen compared to the height measurement and foot examination standards. In fact, in all sample groups the height measurement standard was never met; the highest compliance to the foot examination standard was 6.1% (physicians treating fewer than 10 patients - 1995).

The hemoglobin A1C determination standard is also controlled by visitation and can only be met up to the percentage value for the visitation standard. However, the data indicated compliance with the hemoglobin A1C determination standard was much lower than compliance to the visitation standard. This demonstrates that the physicians did not verbally state that a hemoglobin A1C was needed during all patient visits. The highest compliance to the hemoglobin A1C determination standard was 15.7% (physicians treating more than 10 patients - 1996).

Physician compliance with the visitation frequency standard also affects the remaining standards (lipid profile determination, microalbumin/creatinine clearance determination, dilated eye referral, dietitian referral, and nurse educator referral). However, these standards are affected to a lesser degree than blood pressure, weight and

height measurements, foot examinations, and hemoglobin A1C determinations because the ADA's recommendation is one occurrence per year; allowing the physician to meet these standards with only one visit. Therefore, it would seem likely that physicians would have better compliance with standards recommended once per year. An interesting note with regard to standards recommended once per year was most patients were seen at the clinic at least one time in 1995 and in 1996 (1995 - 90.7% of the main clinic's patients with type 1 diabetes were seen at the clinic at least once; 1996 - 87.7%), making it feasible for a higher physician compliance to the ADA Standards recommended once per year.

Overall Comparisons

The analysis of the data has shown extremely important results regarding the overall care provided to patients with type 1 diabetes by physicians at the participating clinics. Results showed that on most occasions physicians were not complying with the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus" when treating patients with type 1 diabetes. Low compliance was seen in all sample groups regarding the visitation standard and the hemoglobin A1C determination standard, previously stated as "key" standards for achieving good control of diabetes. Compliance to the lipid profile referral standard and the microalbumin/creatinine clearance referral standard were the highest met standards in all sample groups with results ranging from 50-80%. However, the overall trend of the data demonstrated that physician compliance to all standards was less than optimal for 1995 and 1996.

The DCCT has conclusively shown that with an intensive treatment program a mean hemoglobin A1C of 7.2% can be achieved. (American Diabetes Association: Clinical Practice Recommendations, 1997) However, all sample groups' mean hemoglobin A1C values were higher than the recommended 7.2% (Table 14). Overall low physician compliance to the standards precluded any trends linking physician compliance with lower mean hemoglobin A1C values.

Table 14

Ranking of Sample Groups' Mean Hemoglobin A1C Values

Rank	Sample Group	Mean Hemoglobin A1C Value
1	1995 Female Physicians - Main Clinic	7.4%
2	1995 All Physicians - Satellite Clinics, 1995 Adult Patients w/ Type 1 Diabetes - Satellite Clinics	7.9%
3	1996 Female Physicians - Main Clinic, 1995 Physicians Treating <10 Patients w/ Type 1 Diabetes	8.1%
4	1995 Adult Patients with Type 1 Diabetes - Main Clinic	8.3%
5	1995 All Physicians - Main Clinic	8.4%
6	1995 Male Physicians - Main Clinic, 1995 Physicians Treating >10 Patients w/ Type 1 Diabetes	8.5%
7	1996 Adult Patients w/ Type 1 Diabetes-Main Clinic Physicians Treating <10 Patients w/ Type 1 Diabetes	8.6%
8	1996 All Physicians - Main Clinic Physicians Treating >10 Patients w/ Type 1 Diabetes	8.7%
9	1996 Male Physicians - Main Clinic	8.8%
10	1995 Child Patients w/ Type 1 Diabetes - Main Clinic	8.9%
11	1996 Child Patients w/ Type 1 Diabetes - Satellite Clinics	9.5%
12	1996 Child Patients w/ Type 1 Diabetes - Main Clinic, 1995 All Physicians - Satellite Clinics	9.7%
13	1996 Adult Patients - Satellite Clinics	9.8%

Comparison Groups

Main Clinic vs Satellite Clinics

The main clinic's physicians had a higher compliance to all ADA Standards when compared to physicians' compliance at the satellite clinics. This clear trend may be due to the problems associated with rural health care.

Many issues may have attributed to low physician compliance to the ADA Standards at the rural based satellite clinics. Two studies, one by Norris, et al. (1996) and the other by Vanselow (1990), suggest physicians treating patients in rural areas are not prepared for the demands of rural practice, an issue currently being addressed by medical schools. This lack of preparation may be an issue relevant to the satellite clinics and may have attributed to physicians' low compliance. However, the researcher for this study did not focus on the issues of physician preparedness to care for patients with diabetes.

A study performed by Reiber (1996) states persons living in rural areas bypass their local health care facilities to seek treatment in urban medical centers; often traveling great distances. This Minnesota study found persons living in rural areas perceive health care to be better in urban areas than in rural areas. These Minnesota rural residents also believe rural medical facilities lack the technology and resources to properly care for patients. (Reiber, 1996) The Minnesota study may offer a partial explanation of the results found in this study. The researcher discovered evidence that some rural were seeking care at the main clinic. The main clinic physician usually suggested to the patient to seek care in their own community. However, these patients

rarely followed through with the physician's suggestion. Lack of resources may be a valid argument explaining low physician compliance to the dietitian and nurse educator referral standards. Both satellite clinics do not employ a dietitian and one does not employ a nurse educator.

Adult Care vs Child Care - Main Clinic and Satellite Clinics

In 1995 and 1996 physician compliance to all of the ADA Standards was met at a higher percentage for adult patients with type 1 diabetes when compared to compliance to the ADA Standard for children with type 1 diabetes. This trend was seen at the main clinic and satellite clinics. The only exception was compliance to the nurse educator referral standard, which was met at a higher percentage for children with type 1 diabetes. This trend, higher physician compliance to the ADA Standards for adult patients, is not surprising due to the many problems associated with treating children with type 1 diabetes. These problems can make physician compliance to the ADA Standards difficult. The ADA states that a major issue concerning children and adolescents is that of "compliance," and that no matter how sound the medical regimen, it can only be as good as the ability of the family and/or individual to implement it. Behavioral, emotional, and psychosocial factors often interfere with the implementation of an intensive treatment program. (American Diabetes Association: Clinical Practice Recommendations, 1995)

The diagnosis of a child with type 1 diabetes can be devastating to a family and necessitates an abrupt life-style change for all family members. Studies indicate that the

single best predictor of adherence to type 1 diabetes treatment, good metabolic control, and prevention of recurring DKA is a reliable, stable family who has undergone extensive education. Families who are highly organized and cohesive with open communication skills, demonstrate consistent expectations and guidance, and are involved in the type 1 diabetes management program are more likely to have children with type 1 diabetes in good metabolic control. (Pontious, 1996)

The constant presence of the diabetes care team and strict compliance with ADA Standards are essential for the optimal treatment of a child with type 1 diabetes. Reaching team members quickly at any time of the day is a necessity, providing parents and children expert advice, support, and reassurance. (Pontious, 1996) Compliance to the ADA Standards for physicians treating children with type 1 diabetes may be difficult. However, means must be taken by diabetes care team members to implement strategies for children and their parents to comply with standards. Adherence to the ADA Standards are integral to the long term health of children with type 1 diabetes.

Physicians Treating More Than 10 Patients with Type 1 Diabetes vs Physicians Treating Fewer Than 10 Patients with Type 1 Diabetes - Main Clinic

The researcher stated earlier physicians treating more than 10 patients with type 1 diabetes might be expected to have higher compliance to the ADA Standards when compared to physicians treating fewer than 10 patients with type 1 diabetes. Physicians treating more than 10 patients with type 1 diabetes may have a better understanding of the ADA Standards and instinctively adhere to standards because of their high rate of

interaction with patients with diabetes. Physicians treating fewer than 10 patients with type 1 diabetes may be more apt to miss certain standards due to their unfamiliarity with the ADA Standards. Documented research was not found to support any of these expectations; however, analysis of this study's results showed that physicians treating more than 10 patients with type 1 diabetes did in fact have a higher compliance to all ADA Standards. The only exception was seen with the nurse educator referral standard. A cause for this may be that 97% of the patients treated by physicians treating more than 10 patients with type 1 diabetes were adults; a higher compliance to the nurse educator referral standard was also seen in children with type 1 diabetes when compared to adults with type 1 diabetes.

Female Physician Care vs. Male Physician Care - Main Clinic

Evidence suggests that female physicians may be better suited to optimally treat patients with diabetes due to the need for a great deal of interaction between physicians and patients during a visit. A study performed by Arnold, Martin, and Parker (1998) stated that women physicians seemed better able to show sensitivity and caring toward their patients; patients also perceived their female physicians as more caring and empathetic. Two studies investigating physician gender differences and communication with patients found that female physicians conducted longer visits, made more positive statements, asked more questions, smiled and nodded more, talked more, engaged in more positive talk, engaged in more partnership building, and gave more information during visits. (Hall, Irish, Roter, Ehrlich, & Miller, 1994; Roter, Lipkin, & Korsgaard,

1991) Another study investigated gender differences in patient-physician communication during pediatric visits and had similar findings. Female physicians visits were 29% longer, female physicians engaged in more social exchanges, offered more encouragement and reassurance, and communicated more with children when compared to male physicians. Parents were more satisfied with female physicians, while the children stated they were more satisfied with physicians of the same gender. However, all children communicated more with female physicians. (Bernsweig, Takayama, Phibbs, Lewis, & Pantell, 1997) These studies suggest attributes that could greatly enhance diabetes care.

The above mentioned studies suggested to the researcher a higher compliance to the ADA Standards might be seen in female physicians. However, analysis of the data showed male physicians' and female physicians' compliance to the ADA Standards was similar, with a slightly higher compliance demonstrated by male physicians. This slight difference may be due to the fact that all female physicians were grouped in the sample group "physicians treating fewer than 10 patients with type 1 diabetes." The few patients female physician treated in this study may have contributed to the male physicians having a slightly higher compliance to the ADA Standards. As mentioned earlier, treating a small number of patients with diabetes may be a hindrance to compliance with the ADA Standards.

Possible Causes for Low Compliance to the ADA Standards

Patient non-compliance and physicians' differing interpretations and perceived strictness to some of the ADA Standards may have contributed to low physician compliance with the ADA Standards at the participating clinics. Physicians and patients are recognized as being equally important to complying with the visitation frequency standard. However, the remaining ADA Standards (blood pressure, weight and height measurements, foot examinations, a lipid profile, hemoglobin A1Cs, a microalbumin or creatinine clearance, and referrals to an ophthalmologist, dietitian, and nurse educator) are solely controlled by physicians. The researcher limited the effects of non-compliant patients on the visitation frequency standard by not including the following patients with type 1 diabetes: 1) patients named non-compliant by their physician, 2) patients non-compliant due to lack of insurance, 3) patients canceling repeated appointments, and 4) patients not returning within the time suggested by their physician for an appointment. Forty-one patient's medical charts who have type 1 diabetes were removed from this study due to patient compliance problems. Lack of patient insurance for laboratory analyses and patients fear of laboratory analyses were cited in some patient charts as to the reason why certain labs were not performed (lipid profile, hemoglobin A1C, and microalbumin/creatinine clearance). However, this study gave credit to the physician for the suggestion that the patient needed certain labs performed in addition to actual laboratory analysis data. This study has reported a large number of medical charts not included in the study due to non-compliance issues. Steps need to be taken to try to rectify this problem of patient non-compliance.

The design and initiation of a continuous and comprehensive educational program targeted at patients with diabetes to promote behavioral changes associated with optimal diabetes self-management may be beneficial in patient non-compliance problems. This educational program should be implemented by the physicians caring for patients with diabetes and the rest of the diabetes care team.

The initiation of this program should start with a needs assessment of all patients with diabetes. This needs assessment should address personal life-style histories associated with each patient. Key issues are:

- characteristics that influence behavior of the patient
- behavioral goals of the patient
- patient's strengths and weaknesses to past behavioral changes
- patient's knowledge of diabetes
- barriers that may affect change
- patient's attitudes toward diabetes and current diabetes care
- patient's attitude toward her/his physician
- patient's social support system including family and friends

  attitude of patient's employer to her/his diabetes
- patient's attitude toward the clinic and other team members

Behavioral goals should be established by the diabetes care team for the patient based upon the patient's and diabetes care team's goals. Measurable objectives should be developed by the diabetes care team to evaluate patient progress. The design of the

educational program should include behavioral change theories. (McKenzie & Smeltzer, 1997)

One of the strongest theories that would help aid patients' and physicians' nce with ADA Standards is the Health Belief Model (HBM). The Health Belief ...odel states that three factors need to be present for a health related action to take place, 1) the existence of a health concern, 2) the belief that one is susceptible to a serious health concern, 3) the belief if action is taken, the risk of the health concern will be reduced. The HBM is extremely relevant to patients with diabetes and physicians treating patients with diabetes. For example, long term complications associated with diabetes are the patient's and physician's health concern. The patient and physician must believe the patient is susceptible to long-term complications. If the patient and physician comply with an intensive treatment program they must believe the patient will reduce the threat and risk of long term complications.

The Transtheoretical Model or Stages of Change consists of five steps that can help the patient prepare for change. The five steps include 1) Precontemplation - not thinking about change in the next six months, 2) Contemplation - seriously thinking about change in the next six months, 3) Preparation - actively planning change, 4) Action - making changes, 5) Maintenance - taking steps to sustain change and resist relapse. This model provides the diabetes care team with an understanding that each patient accepts change at a different pace. Change is not a smooth process and very rarely do people progress through the stages linearly. ("Just do it"isn't enough: change comes in stages, 1996) Patients with diabetes will most likely be in different stages of change with

each treatment goal. Interventions need to be targeted to where patients are in terms of stages of change for each treatment goal.

The Stimulus Response Theory states the use of positive or negative reinforcements and punishments can help increase or decrease the targeted behavior change. Physicians could use acceptable hemoglobin A1C values and the new behaviors learned by the patient to accomplish acceptable values as a reinforcement to help the patient and physician comply with ADA Standards. The use of this behavior change may help the patient want to return for visits and help the physician become more accountable for their patient's well-being.

The wording of the ADA's visitation standard leaves room for varying interpretations. In addition, four physicians at the participating clinic suggested to the researcher that the 1995/1996 visitation frequency and hemoglobin A1C determination standards were too strict. Physicians' differing interpretations and perceived strictness of the ADA Standards may have attributed to low physician compliance to the ADA Standards.

The 1997 ADA recommendation for visitation frequency is:

> Insulin-treated patients should generally be seen at least quarterly until achievement of all treatment goals. Thereafter, the frequency of visits may be decreased as long as the patient continues to achieve all treatment goals. (p. S8)

This statement is compared to the 1995/1996 ADA recommendation for visitation frequency which states:

> Regular visits should be scheduled for insulin-treated patients at least quarterly depending on achievement of treatment goals. (p. 11)

The differences between these two statements are very subtle. Both recommendations suggest less frequent visits may be assumed when the patient achieves treatment goals. The addition of the last sentence in the 1997 ADA recommendation for visitation merely reiterates less frequent visits may be assumed as long as the patient achieves treatment goals. The statement "achievement of treatment goals" allows for varying interpretations with regard to the frequency of visits. However, the ADA does not state what specific treatment goals need to be met to validate "less frequent visits." Furthermore, the ADA does not recommend frequency of visits if treatment goals are achieved by the patient.

The 1997 ADA recommendation for hemoglobin A1C determinations states:

> A hemoglobin A1C measurement should be performed approximately every three months to determine whether a patient's metabolic control has remained continuously within the target range.... For any individual patient, the frequency of hemoglobin A1C testing should be dependent on the treatment regimen employed and on the judgement of the clinician. Expert opinion recommends hemoglobin A1C testing at least one or two times a year in patients with a history of stable glycemic control and quarterly assessments in patients whose therapy has changed or who are in poor control. (p. S8)

This statement is compared to the 1995/1996 ADA recommendation for hemoglobin A1C determinations which states:

> A hemoglobin A1C determination should be performed at least quarterly in all insulin treated patients. (p. 11)

The 1997 ADA recommendation for hemoglobin A1Cs is clearly different from the 1995/1996 recommendation. The recommendation for the 1997 hemoglobin A1C standard suggests a more lenient approach to the frequency of hemoglobin A1C determinations, supporting the physicians' claim that the 1995/1996 hemoglobin A1C determination standard was too strict.

As seen above, the visitation frequency standard allows for varying interpretations. Given the impact of the visitation standard on all other standards, differing interpretations may have attributed to low physician compliance to all ADA Standards. Physicians' perceived strictness of hemoglobin A1C determinations may have also affected the results for this standard. However, this study assumed a very strict interpretation of the 1995/1996 ADA Standards for two specific reasons, 1) the ADA does not offer recommendations for visitation frequency if treatment goals are met by the patient, and 2) the ADA does not state specific treatment goals that must be met for a more lenient approach to be warranted.

Recommendations

Results of this study indicate compliance with the ADA Standards could be greatly improved by physicians at the participating clinics. No attempt has been made to generalize any of this study's findings to other clinics and hospitals. However, review of the literature has shown a lack of information documenting the quality of care received by patients with diabetes based upon the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus." This lack of information, coupled with this study's findings of low physician compliance with the ADA Standards, supports the need for recommendations for improving compliance with ADA Standards. These recommendations are grouped in two categories: 1) the administration of health care facilities, and 2) physicians and other diabetes care team members treating patients with diabetes. The following recommendations are suggested:

1. Specific recommendations for the administration of health care facilities:
    * Support compliance with the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus."
    * Support an alliance in institutions with an established affiliation between large (urban based) and small (rural based) health care facilities. A strong alliance may ensure provision of allied health care professionals and the use of technology and resources that may be absent in smaller (rural based) health care facilities. If a lack of affiliation exists, small (rural based) health care facilities need to address the concept of regional support. Examples for affiliated institutions may include the concept of

job-sharing; unaffiliated health care facilities should cooperate with regional health care facilities that can provide needed resources.

* Provide ongoing support, information, and education to rural based health care facilities and physicians treating few patients with diabetes in efforts to equal the care provided in urban based health care facilities and by physicians treating many patients with diabetes. Ongoing support, information, and education should include:
  - a yearly overview of the ADA Standards
  - in-service training
  - the use of e-mail and the Internet to find, forward, and discuss relevant issues and information

  Unaffiliated rural health care facilities need to address the concept of regional education and training programs.

* Regularly and routinely assess physician compliance to the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus."

2. Specific recommendations for physicians and other diabetes care team members:

* Ensure the coding system correctly classifies patients with type 1 and type 2 diabetes.

* Define and agree on the interpretation of the ADA Standards, including a definition of "treatment goals" and a recommendation for visitation frequency if patients are achieving treatment goals.

* Support compliance with the ADA's "Standards of Medical Care for Patients with Diabetes Mellitus".
* Educate patients with diabetes regarding the existence and importance of the ADA Standards during a regular diabetic visit; thoroughly discussing each standard. Suggestions to aid patient education 1) give all patients with diabetes and/or family members a pamphlet explaining the ADA Standards, and 2) place a poster detailing the ADA Standards for patients with type 1 and type 2 diabetes in all examination rooms.
* Design, implement, and evaluate a continuous and comprehensive educational program using behavioral change theories targeting patients with diabetes patients to help promote behavioral changes associated with optimal diabetes self-management. Specific behavioral change theories used in the educational program should include the Health Belief Model, Transtheoretical Model, and the Stimulus Response Theory.
* Develop and implement a means of quickly assessing compliance to ADA Standards. Examples of flow-sheets (see Figures 2 and 3) to track compliance with the ADA Standards for adults and children are provided.

Diabetes Visits (Quarterly)	Date					
Blood Pressure Measurement (During All Diabetes Visits)	Date					
	Value					
Weight Measurement (During All Diabetes Visits)	Date					
	Value					
Foot Examination (During All Diabetes Visits)	Date					
	Performed					
Funduscopy (During All Diabetes Visits)	Date					
	Performed					
LABS						
Hemoglobin A1C Analysis (Quarterly)	Date					
	Value					
Lipid Profile (Once per Year)	Date					
	Total Chol					
	LDL / HDL					
	TG					
Microalbumin (Once per Year)	Date					
	Value					
REFERRALS						
Dilated Eye Referral (Once per Year)	Date					
	Date of Exam					
Nurse Educator Referral (Once per Year)	Date					
	Date of Exam					

Figure 2. Flow-sheet designed to track the occurrence of ADA Standards for adults with diabetes.

Diabetes Visits (Quarterly)	Date					
Blood Pressure Measurement (During All Diabetes Visits)	Date					
	Value					
Weight Measurement (During All Diabetes Visits)	Date					
	Value					
Height Measurement (During All Diabetes Visits)	Date					
	Value					
Foot Examination (During All Diabetes Visits)	Date					
	Performed					
Funduscopy (During All Diabetes Visits)	Date					
	Performed					
Sexual Maturation (Peridodically)	Date					
	Performed					
LABS						
Hemoglobin A1C Analysis (Quarterly)	Date					
	Value					
Lipid Profile (Once per Year)	Date					
	Total Chol					
	LDL / HDL					
	TG					
Microalbumin (Once per Year)	Date					
	Value					
REFERRALS						
Dilated Eye Referral (Once per Year)	Date					
	Date of Exam					
Dietitian Referral (Once per Year)	Date					
	Date of Exam					
Nurse Educator Referral (Once per Year)	Date					
	Date of Exam					

Figure 3. Flow-sheet designed to track the occurrence of ADA Standards for children with diabetes.

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APPENDIX A

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	107	4	1	25.2	9.3	25.2	15.0	9.3	10.3	30.8	58.9	41.1
Blood Pressure Measurement Standard	107	4	1	29.0	13.1	29.0	14.0	9.3	7.5	27.1	65.4	34.6
Weight Measurement Standard	107	4	1	30.8	12.1	30.8	13.1	13.1	11.2	19.6	69.2	30.8
Height Measurement Standard	16	4	0	37.5	37.5	31.3	31.3	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	107	4	0	56.1	56.1	29.9	7.5	2.8	1.9	1.9	96.3	3.7
Hemoglobin A1C Determination Standard	107	4	1	37.4	16.8	37.4	24.3	13.1	4.7	3.7	91.6	8.4
Lipid Profile Standard	91	1	1	42.9	33.0	42.9	n/a	n/a	n/a	n/a	33.0	67.0
Microalbumin / Creatinine Clearance Standard	91	1	0	48.4	48.4	34.1	n/a	n/a	n/a	n/a	48.4	51.6
Dilated Eye Referral Standard	94	1	0	54.3	54.3	36.2	n/a	n/a	n/a	n/a	54.3	45.7
Dietitian Referral Standard	16	1	0	56.3	56.3	18.8	n/a	n/a	n/a	n/a	56.3	43.8
Nurse Educator Referral Standard	107	1	0	85.0	85.0	6.5	n/a	n/a	n/a	n/a	85.0	15.0

APPENDIX B

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	122	4	1	24 6	12 3	24 6	14 8	11 5	5.7	31 1	63 1	36 9
Blood Pressure Measurement Standard	122	4	1	27 9	16 4	27 9	15 6	10 7	2 5	27 0	70.5	29 5
Weight Measurement Standard	122	4	1	31 1	15 6	31 1	15 6	9 0	4.1	24 6	71 3	28 7
Height Measurement Standard	20	4	0	50 0	50 0	35.0	15 0	0 0	0.0	0 0	100 0	0 0
Foot Examination Standard	122	4	1	41 0	39 3	41.0	12 3	4 1	1 6	1 6	96 7	3 3
Hemoglobin A1C Determination Standard	122	4	1	31 1	21 3	31 1	24 6	9 8	8.2	4 9	86 9	13.1
Lipid Profile Standard	101	1	1	48 5	29 7	48 5	n/a	n/a	n/a	n/a	29 7	70.3
Microalbumin / Creatinine Clearance Standard	103	1	1	44 7	36 9	44 7	n/a	n/a	n/a	n/a	36 9	63.1
Dilated Eye Referral Standard	107	1	0	55 1	55.1	32 7	n/a	n/a	n/a	n/a	55 1	44 9
Dietitian Referral Standard	19	1	0	26 3	26 3	15 8	n/a	n/a	n/a	n/a	26 3	73 7
Nurse Educator Referral Standard	122	1	0	63 9	63 9	14 8	n/a	n/a	n/a	n/a	63 9	36 1

APPENDIX C

1995 Physician Compliance to ADA Standards

for Patients with Type I Diabetes

Main Clinic - Adults with Type I Diabetes

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Adults with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	91	4	1	23 1	8 8	23 1	16 5	7 7	9 9	34 1	56 0	44 0
Blood Pressure Measurement Standard	91	4	1	25 3	12 1	25 3	13.2	9 9	8.8	30 8	60 4	39 6
Weight Measurement Standard	91	4	1	29 7	12 1	29 7	11 0	13 2	12 1	22 0	65 9	34 1
Height Measurement Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Foot Examination Standard	91	4	0	49 5	49 5	34 1	8.8	3 3	2 2	2 2	95.6	4 4
Hemoglobin A1C Determination Standard	91	4	1	36 3	18 7	36 3	20 9	14 3	4 9	3.9	90 1	9 9
Lipid Profile Standard	91	1	1	42 9	33 0	42 9	n/a	n/a	n/a	n/a	33 0	67 0
Microalbumin / Creatinine Clearance Standard	86	1	0	47 7	47 7	34 9	n/a	n/a	n/a	n/a	47 7	52 3
Dilated Eye Referral Standard	88	1	0	55 7	55 7	35 2	n/a	n/a	n/a	n/a	55 7	44 3
Dietitian Referral Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nurse Educator Referral Standard	91	1	0	89 0	89 0	7 7	n/a	n/a	n/a	n/a	89.0	11.0

APPENDIX D

1996 Physician Compliance to ADA Standards

for Patients with Type I Diabetes

Main Clinic - Adults with Type I Diabetes

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Adults with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	104	4	1	26.0	10.6	26.0	11.5	12.5	4.8	34.6	60.6	39.4
Blood Pressure Measurement Standard	104	4	1	25.0	12.5	25.0	15.4	12.5	2.9	31.7	65.4	34.6
Weight Measurement Standard	104	4	1	29.8	13.5	29.8	14.4	9.6	3.8	28.8	67.3	32.7
Height Measurement Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Foot Examination Standard	104	4	1	44.2	33.7	43.3	13.5	4.8	1.9	1.9	96.2	3.8
Hemoglobin A1C Determination Standard	104	4	1	29.8	22.1	29.8	24.0	9.6	8.7	5.8	85.6	14.4
Lipid Profile Standard	101	1	1	48.5	29.7	48.5	n/a	n/a	n/a	n/a	29.7	70.3
Microalbumin / Creatinine Clearance Standard	99	1	1	45.5	35.4	45.5	n/a	n/a	n/a	n/a	35.4	64.6
Dilated Eye Referral Standard	99	1	0	53.5	53.5	33.3	n/a	n/a	n/a	n/a	53.5	46.5
Dietitian Referral Standard	1	1	7	100.0	0.0	0.0	n/a	n/a	n/a	n/a	0.0	100.0
Nurse Educator Referral Standard	104	1	0	68.3	68.3	13.5	n/a	n/a	n/a	n/a	68.3	31.7

APPENDIX E

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Children with Type I Diabetes

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Children with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	16	4	1	37.5	12.5	37.5	6.3	18.8	12.5	12.5	73.3	26.7
Blood Pressure Measurement Standard	16	4	1	50.0	18.8	50.0	18.8	6.3	0.0	6.3	93.8	6.3
Weight Measurement Standard	16	4	1	37.5	12.5	37.5	25.0	12.5	6.3	6.3	87.5	12.5
Height Measurement Standard	16	4	0	37.5	37.5	31.3	31.3	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	16	4	0	93.8	6.3	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Hemoglobin A1C Determination Standard	16	4	1 and 2	43.8	6.3	43.8	43.8	6.3	0.0	0.0	100.0	0.0
Lipid Profile Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Microalbumin / Creatinine Clearance Standard	5	1	0	60.0	60.0	20.0	n/a	n/a	n/a	n/a	60.0	40.0
Dilated Eye Referral Standard	6	1	1	50.0	33.3	50.0	n/a	n/a	n/a	n/a	33.3	66.7
Dietitian Referral Standard	16	1	0	56.3	56.3	18.8	n/a	n/a	n/a	n/a	56.3	43.8
Nurse Educator Referral Standard	16	1	0	62.5	62.5	18.8	n/a	n/a	n/a	n/a	62.5	37.5

APPENDIX F

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Children with Type I Diabetes

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Children with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	18	4	2	33.3	22.2	16.7	33.3	5.6	11.1	11.1	77.8	22.2
Blood Pressure Measurement Standard	18	4	1	44.4	38.9	44.4	16.7	0.0	0.0	0.0	100.0	0.0
Weight Measurement Standard	18	4	1	38.9	27.8	38.9	22.2	5.6	5.6	0.0	94.4	5.6
Height Measurement Standard	18	4	0	50.0	50.0	33.3	16.7	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	18	4	0	72.2	72.2	22.2	5.6	0.0	0.0	0.0	100.0	0.0
Hemoglobin A1C Determination Standard	18	4	1	38.9	16.7	38.9	27.8	11.1	5.6	0.0	94.4	5.6
Lipid Profile Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Microalbumin / Creatinine Clearance Standard	4	1	0	75.0	75.0	25.0	n/a	n/a	n/a	n/a	75.0	25.0
Dilated Eye Referral Standard	8	1	0	75.0	75.0	25.0	n/a	n/a	n/a	n/a	75.0	25.0
Dietitian Referral Standard	18	1	0	27.8	27.8	16.7	n/a	n/a	n/a	n/a	27.8	72.2
Nurse Educator Referral Standard	18	1	0	38.9	38.9	22.2	n/a	n/a	n/a	n/a	38.9	61.1

APPENDIX G

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Female Physicians

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Female Physicians

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	17	4	0 and 1	23.5	23.5	23.5	17.6	11.8	0.0	23.5	76.5	23.5
Blood Pressure Measurement Standard	17	4	1	41.2	23.5	41.2	5.9	5.9	0.0	23.5	76.5	23.5
Weight Measurement Standard	17	4	0 and 1	29.4	29.4	29.4	11.8	5.9	0.0	23.5	76.5	23.5
Height Measurement Standard	6	4	1	66.7	16.7	66.7	16.7	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	17	4	0	82.4	82.4	11.8	5.9	0.0	0.0	0.0	100.0	0.0
Hemoglobin A1C Determination Standard	17	4	1	52.9	11.8	52.9	29.4	0.0	0.0	5.9	94.1	5.9
Lipid Profile Standard	11	1	0	54.5	54.5	36.4	n/a	n/a	n/a	n/a	54.5	45.5
Microalbumin / Creatinine Clearance Standard	12	1	0	58.3	58.3	25.0	n/a	n/a	n/a	n/a	58.3	41.7
Dilated Eye Referral Standard	13	1	0	69.2	69.2	30.8	n/a	n/a	n/a	n/a	69.2	30.8
Dietitian Referral Standard	6	1	0	33.3	33.3	16.7	n/a	n/a	n/a	n/a	33.3	66.7
Nurse Educator Referral Standard	17	1	0	52.9	52.9	17.6	n/a	n/a	n/a	n/a	52.9	47.1

APPENDIX H

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Female Physicians

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Female Physicians

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	20	4	1	25.0	15.0	25.0	10.0	10.0	10.0	30.0	60.0	40.0
Blood Pressure Measurement Standard	20	4	1	35.0	25.0	35.0	10.0	5.0	5.0	20.0	75.0	25.0
Weight Measurement Standard	20	4	1	30.0	25.0	30.0	10.0	15.0	0.0	20.0	80.0	20.0
Height Measurement Standard	7	4	0	57.1	57.1	28.6	14.3	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	20	4	0	60.0	60.0	25.0	10.0	0.0	5.0	0.0	95.0	5.0
Hemoglobin A1C Determination Standard	20	4	1	45.0	15.0	45.0	30.0	5.0	0.0	5.0	95.0	5.0
Lipid Profile Standard	12	1	1	58.3	25.0	58.3	n/a	n/a	n/a	n/a	25.0	75.0
Microalbumin / Creatinine Clearance Standard	13	1	0	46.2	46.2	38.5	n/a	n/a	n/a	n/a	46.2	53.8
Dilated Eye Referral Standard	15	1	0	53.3	53.3	33.3	n/a	n/a	n/a	n/a	53.3	46.7
Dietitian Referral Standard	7	1	2	28.6	28.6	14.3	n/a	n/a	n/a	n/a	28.6	71.4
Nurse Educator Referral Standard	20	1	0	50.0	50.0	20.0	n/a	n/a	n/a	n/a	50.0	50.0

APPENDIX I

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Male Physicians

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Male Physicians

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	90	4	1	25.6	6.7	25.6	14.4	8.9	12.2	32.2	55.6	44.4
Blood Pressure Measurement Standard	90	4	1	26.7	11.1	26.7	15.6	10.0	8.9	26.7	63.3	36.7
Weight Measurement Standard	90	4	1	30.0	8.9	30.0	13.3	14.4	13.3	18.9	67.8	32.2
Height Measurement Standard	10	4	0	50.0	50.0	10.0	40.0	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	90	4	0	51.1	51.1	33.3	7.8	3.3	2.2	2.2	95.6	4.4
Hemoglobin A1C Determination Standard	90	4	1	34.4	17.8	34.4	23.3	15.6	5.6	3.3	91.1	8.9
Lipid Profile Standard	80	1	1	43.8	30.9	43.8	n/a	n/a	n/a	n/a	31.3	68.8
Microalbumin / Creatinine Clearance Standard	79	1	0	46.8	46.8	35.4	n/a	n/a	n/a	n/a	46.8	53.2
Dilated Eye Referral Standard	81	1	0	51.9	51.9	37.0	n/a	n/a	n/a	n/a	51.9	48.1
Dietitian Referral Standard	10	1	0	70.0	70.0	20.0	n/a	n/a	n/a	n/a	70.0	30.0
Nurse Educator Referral Standard	90	1	0	91.1	91.1	4.4	n/a	n/a	n/a	n/a	91.1	8.9

APPENDIX J

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Male Physicians

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Male Physicians

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	102	4	1	24.5	11.8	24.5	15.7	11.8	4.9	31.4	63.7	36.3
Blood Pressure Measurement Standard	102	4	1	26.5	14.7	26.5	16.7	11.8	2.0	28.4	69.6	30.4
Weight Measurement Standard	102	4	1	31.4	13.7	31.4	16.7	7.8	4.9	25.5	69.6	30.4
Height Measurement Standard	13	4	0	46.2	46.2	38.5	15.4	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	102	4	1	44.1	35.3	44.1	12.7	4.9	1.0	2.0	97.1	2.9
Hemoglobin A1C Determination Standard	102	4	1	28.4	22.5	28.4	23.5	10.8	9.8	4.9	85.3	14.7
Lipid Profile Standard	89	1	1	46.1	31.5	46.1	n/a	n/a	n/a	n/a	31.5	68.5
Microalbumin / Creatinine Clearance Standard	90	1	1	45.6	35.6	45.6	n/a	n/a	n/a	n/a	35.6	64.4
Dilated Eye Referral Standard	92	1	0	55.4	55.4	32.6	n/a	n/a	n/a	n/a	55.4	44.6
Dietitian Referral Standard	12	1	0 and 2	25.0	25.0	16.7	n/a	n/a	n/a	n/a	25.0	75.0
Nurse Educator Referral Standard	102	1	0	66.7	66.7	14.7	n/a	n/a	n/a	n/a	65.7	34.3

APPENDIX K

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Physicians Treating >10 Patients with Type I Diabetes

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Physicians Treating >10 Patients with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	74	4	1	25.7	6.8	25.7	14.9	8.1	9.5	35.1	55.4	44.6
Blood Pressure Measurement Standard	74	4	1	27.0	10.8	27.0	12.2	9.5	9.5	31.1	59.5	40.5
Weight Measurement Standard	74	4	1	31.1	9.5	31.1	10.8	13.5	13.5	21.6	64.9	35.1
Height Measurement Standard	1	4	1	100.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	74	4	0	50.0	50.0	35.1	9.5	2.7	1.4	1.4	97.3	2.7
Hemoglobin A1C Determination Standard	74	4	1	35.1	18.9	35.1	21.6	16.2	5.4	2.7	91.9	8.1
Lipid Profile Standard	73	1	1	42.5	30.1	42.5	n/a	n/a	n/a	n/a	30.1	69.9
Microalbumin / Creatinine Clearance Standard	70	1	0	47.1	47.1	35.7	n/a	n/a	n/a	n/a	47.1	52.9
Dilated Eye Referral Standard	70	1	0	54.3	54.3	35.7	n/a	n/a	n/a	n/a	54.3	45.7
Dietitian Referral Standard	1	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0
Nurse Educator Referral Standard	74	1	0	91.9	91.9	4.1	n/a	n/a	n/a	n/a	91.9	8.1

APPENDIX L

1996 Physician Compliance to ADA Standards for

Patients with Type I Diabetes

Main Clinic - Physicians Treating >10 Patients with Type I Diabetes

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Physicians Treating >10 Patients with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	83	4	1	25.3	12.0	25.3	12.0	10.8	3.6	36.1	60.2	39.8
Blood Pressure Measurement Standard	83	4	1	25.3	13.3	25.3	15.7	10.8	2.4	32.5	65.1	34.9
Weight Measurement Standard	83	4	1	30.1	13.3	30.1	14.5	8.4	4.8	28.9	66.3	33.7
Height Measurement Standard	3	4	0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	83	4	1	43.4	343.4	43.4	13.3	6.0	1.2	2.4	96.4	3.6
Hemoglobin A1C Determination Standard	83	4	1	28.9	22.9	28.9	25.3	7.2	9.6	6.0	84.3	15.7
Lipid Profile Standard	80	1	1	46.3	31.3	46.3	n/a	n/a	n/a	n/a	31.3	68.8
Microalbumin / Creatinine Clearance Standard	77	1	1	49.4	18.2	49.4	n/a	n/a	n/a	n/a	31.2	68.8
Dilated Eye Referral Standard	77	1	0	51.9	51.9	35.1	n/a	n/a	n/a	n/a	51.9	48.1
Dietitian Referral Standard	1	1	7	100.0	0.0	0.0	n/a	n/a	n/a	n/a	0.0	100.0
Nurse Educator Referral Standard	83	1	0	63.9	63.9	16.9	n/a	n/a	n/a	n/a	63.9	36.1

APPENDIX M

1995 Physician Compliance to ADA Standards for

Patients with Type I Diabetes

Main Clinic - Physicians Treating <10 Patients with Type I Diabetes

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Physicians Treating <10 Patients with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	33	4	1	25 7	15 2	24 2	15 2	12 1	12 1	0 2	66 7	33 3
Blood Pressure Measurement Standard	33	4	1	33 3	18 2	33 3	18 2	9 1	3 0	18 2	78 8	21 2
Weight Measurement Standard	33	4	1	30 3	18 2	30 3	18 2	12 1	6 1	15 2	78 8	21 2
Height Measurement Standard	15	4	0	40 0	40 0	26 7	33 3	0 0	0 0	0 0	100 0	0 0
Foot Examination Standard	33	4	0	69 7	69 7	18 2	3 0	3 0	3 0	3 0	93 9	6 1
Hemoglobin A1C Determination Standard	33	4	1	42 4	12 1	42 4	30 3	6 1	3 0	6 1	90 9	9 1
Lipid Profile Standard	18	1	0	44 4	44 4	44 4	n/a	n/a	n/a	n/a	44 4	55 6
Microalbumin / Creatinine Clearance Standard	21	1	0	52 4	52 4	28 6	n/a	n/a	n/a	n/a	52 4	47 6
Dilated Eye Referral Standard	24	1	0	54 2	54 2	37 5	n/a	n/a	n/a	n/a	54 2	45 8
Dietitian Referral Standard	15	1	0	53 3	53 3	20 0	n/a	n/a	n/a	n/a	53 3	46 7
Nurse Educator Referral Standard	33	1	0	69 7	69 7	12 1	n/a	n/a	n/a	n/a	69 7	30 3

APPENDIX N

1996 Physician Compliance to ADA Standards for

Patients with Type I Diabetes

Main Clinic - Physicians Treating <10 Patients with Type I Diabetes

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Main Clinic - Physicians Treating <10 Patients with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	39	4	1	23.1	12.8	23.1	20.5	12.8	10.3	20.5	69.2	30.8
Blood Pressure Measurement Standard	39	4	1	33.3	23.1	33.3	15.4	10.3	2.6	15.4	82.1	17.9
Weight Measurement Standard	39	4	1	33.3	20.5	33.3	17.9	10.3	2.6	15.4	82.1	17.9
Height Measurement Standard	17	4	0 and 1	41.2	41.2	41.2	17.6	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	39	4	0	51.3	51.3	35.9	10.3	0.0	2.6	0.0	97.4	2.6
Hemoglobin A1C Determination Standard	39	4	1	35.9	17.9	35.9	23.1	15.4	5.1	2.6	92.3	7.7
Lipid Profile Standard	21	1	1	57.1	19.0	57.1	n/a	n/a	n/a	n/a	19.0	81.0
Microalbumin / Creatinine Clearance Standard	26	1	0	53.8	53.8	30.8	n/a	n/a	n/a	n/a	53.8	46.2
Dilated Eye Referral Standard	30	1	0	63.3	63.3	26.7	n/a	n/a	n/a	n/a	63.3	36.7
Dietitian Referral Standard	17	1	0 and 2	23.5	23.5	17.6	n/a	n/a	n/a	n/a	23.5	76.5
Nurse Educator Referral Standard	39	1	0	61.5	61.5	12.8	n/a	n/a	n/a	n/a	61.5	38.5

APPENDIX O

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes Satellite Clinics

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	15	4	0 and 1	26 7	26 7	26 7	0 0	20 0	6.7	20 0	73.3	26.7
Blood Pressure Measurement Standard	15	4	0	46 7	46 7	26 7	6 7	0 0	0 0	20 0	80 0	20 0
Weight Measurement Standard	15	4	0	66 7	66 7	20 0	0 0	0 0	13 3	0 0	86.7	13 3
Height Measurement Standard	4	4	0	100 0	100 0	0 0	0 0	0 0	0 0	0 0	100 0	0.0
Foot Examination Standard	15	4	0	93 3	93 3	6 7	0 0	0 0	0 0	0 0	100 0	0 0
Hemoglobin A1C Determination Standard	15	4	0	73 3	73 3	20 0	6 7	0 0	0 0	0 0	100 0	0 0
Lipid Profile Standard	11	1	0	63.6	63 6	27.3	n/a	n/a	n/a	n/a	63 6	36.4
Microalbumin / Creatinine Clearance Standard	12	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0
Dilated Eye Referral Standard	12	1	0	83 3	83 3	16 7	n/a	n/a	n/a	n/a	83 3	16 7
Dietitian Referral Standard	4	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0
Nurse Educator Referral Standard	15	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0

APPENDIX P

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes Satellite Clinics

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	16	4	0	37.5	37.5	25.0	6.3	18.8	6.3	6.3	87.5	12.5
Blood Pressure Measurement Standard	16	4	0	68.8	68.8	6.3	6.3	12.5	0.0	6.3	93.8	6.3
Weight Measurement Standard	16	4	0	68.8	68.8	18.8	0.0	6.3	0.0	6.3	93.8	6.3
Height Measurement Standard	4	4	0	75.0	75.0	25.0	0.0	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	16	4	0	93.8	93.8	6.3	0.0	0.0	0.0	0.0	100.0	0.0
Hemoglobin A1C Determination Standard	16	4	0	75.0	75.0	12.5	6.3	6.3	0.0	0.0	100.0	0.0
Lipid Profile Standard	12	1	0	66.7	66.7	8.3	n/a	n/a	n/a	n/a	66.7	33.3
Microalbumin / Creatinine Clearance Standard	13	1	0	76.9	76.9	15.4	n/a	n/a	n/a	n/a	76.9	23.1
Dilated Eye Referral Standard	13	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0
Dietitian Referral Standard	4	1	0	75.0	75.0	25.0	n/a	n/a	n/a	n/a	75.0	25.0
Nurse Educator Referral Standard	16	1	0	87.5	87.5	12.5	n/a	n/a	n/a	n/a	87.5	12.5

APPENDIX Q

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Adults with Type I Diabetes

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Adults with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	11	4	1 and 3	27 3	18 2	27 3	0 0	27 3	0.0	27 3	72 7	27 3
Blood Pressure Measurement Standard	11	4	1	36 4	36 4	27 3	9 1	0 0	0.0	27 3	72 7	27 3
Weight Measurement Standard	11	4	0	54 5	54 5	27 3	0 0	0 0	18.2	0.0	81 8	18 2
Height Measurement Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Foot Examination Standard	11	4	0	90 9	90 9	9 1	0 0	0 0	0 0	0 0	100 0	0 0
Hemoglobin A1C Determination Standard	11	4	0	63 6	63 6	27 3	9 1	0 0	0 0	0 0	100 0	0 0
Lipid Profile Standard	11	1	0	63 6	63 6	27 3	n/a	n/a	n/a	n/a	63 6	36 4
Microalbumin / Creatinine Clearance Standard	11	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0
Dilated Eye Referral Standard	11	1	0	81 8	81 8	18 2	n/a	n/a	n/a	n/a	81 8	18 2
Dietitian Referral Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nurse Educator Referral Standard	11	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0

APPENDIX R

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Adults with Type I Diabetes

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Adults with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	12	4	0	41.7	41.7	16.7	8.3	16.7	8.3	8.3	83.3	16.7
Blood Pressure Measurement Standard	12	4	0	58.3	58.3	8.3	8.3	16.7	0.0	8.3	91.7	8.3
Weight Measurement Standard	12	4	0	66.7	66.7	16.7	0.0	8.3	0.0	8.3	91.7	8.3
Height Measurement Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Foot Examination Standard	12	4	0	91.7	91.7	8.3	0.0	0.0	0.0	0.0	100.0	0.0
Hemoglobin A1C Determination Standard	12	4	0	75.0	75.0	8.3	8.3	8.3	0.0	0.0	100.0	0.0
Lipid Profile Standard	12	1	0	66.7	66.7	8.3	n/a	n/a	n/a	n/a	66.7	33.3
Microalbumin / Creatinine Clearance Standard	12	1	0	75.0	75.0	16.7	n/a	n/a	n/a	n/a	75.0	25.0
Dilated Eye Referral Standard	12	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0
Dietitian Referral Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Nurse Educator Referral Standard	12	1	0	91.7	91.7	8.3	n/a	n/a	n/a	n/a	91.7	8.3

APPENDIX S

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Children with Type I Diabetes

1995 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Children with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	4	4	0	50.0	50.0	25.0	0.0	0.0	25.0	0.0	75.0	25.0
Blood Pressure Measurement Standard	4	4	0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Weight Measurement Standard	4	4	0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Height Measurement Standard	4	4	0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Foot Examination Standard	4	4	0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Hemoglobin A1C Determination Standard	4	4	0	100.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Lipid Profile Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Microalbumin / Creatinine Clearance Standard	1	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0
Dilated Eye Referral Standard	1	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0
Dietitian Referral Standard	4	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0
Nurse Educator Referral Standard	4	1	0	100.0	100.0	0.0	n/a	n/a	n/a	n/a	100.0	0.0

APPENDIX T

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Children with Type I Diabetes

1996 Physician Compliance to ADA Standards for Patients with Type I Diabetes

Satellite Clinics - Children with Type I Diabetes

ADA Standard	# of Charts	ADA recommendation for Standard (# of occurrences per year)	Mode	Percentage at Mode	Percentage at 0 occurrences	Percentage at 1 occurrence	Percentage at 2 occurrences	Percentage at 3 occurrences	Percentage at 4 occurrences	Percentage of occurrences > 4	Percentage not meeting ADA recommendation	Percentage meeting or exceeding ADA recommendation
Visitation Standard	4	4	1	50 0	25 0	50 0	0 0	25 0	0 0	0 0	100 0	0 0
Blood Pressure Measurement Standard	4	4	0	100 0	0 0	0 0	0 0	0 0	0 0	0 0	100 0	0 0
Weight Measurement Standard	4	4	0	75 0	75 0	25 0	0 0	0 0	0 0	0 0	100 0	0 0
Height Measurement Standard	4	4	0	75 0	75 0	25 0	0 0	0 0	0 0	0 0	100 0	0 0
Foot Examination Standard	4	4	0	100 0	100 0	0 0	0 0	0 0	0 0	0 0	100 0	0 0
Hemoglobin A1C Determination Standard	4	4	0	75 0	75 0	25 0	0 0	0 0	0 0	0 0	100 0	0 0
Lipid Profile Standard	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Microalbumin / Creatinine Clearance Standard	1	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0
Dilated Eye Referral Standard	2	1	0	100 0	100 0	0 0	n/a	n/a	n/a	n/a	100 0	0 0
Dietitian Referral Standard	4	1	0	75 0	75 0	25 0	n/a	n/a	n/a	n/a	75 0	25 0
Nurse Educator Referral Standard	4	1	0	75 0	75 0	25 0	n/a	n/a	n/a	n/a	75 0	25 0

APPENDIX U

1995/1996 Mean Hemoglobin A1C Results

All Sample Groups

1995/1996 Mean Hemoglobin A1C Results

All Sample Groups

1995	Mean Hemoglobin A1C Values - All Physicians - Main Clinic	Mean Hemoglobin A1C Values of Adult (>18) Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values of Child (<18) Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values of Male Physicians - Main Clinic	Mean Hemoglobin A1C Values of Female Physicians - Main Clinic	Mean Hemoglobin A1C Values of Physicians Treating >10 Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values of Physicians Treating <10 Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values - All Physicians - Satellite Clinics	Mean Hemoglobin A1C Values of Adult (>18) Type I Diabetic Patients - Satellite Clinics	Mean Hemoglobin A1C Values of Child (<18) Type I Diabetic Patients - Satellite Clinics
Hemoglobin A1C Value (%)	8.4	8.3	8.9	8.5	7.4	8.5	8.1	7.9	7.9	/

1996	Mean Hemoglobin A1C Values - All Physicians - Main Clinic	Mean Hemoglobin A1C Values of Adult (>18) Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values of Child (<18) Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values of Male Physicians - Main Clinic	Mean Hemoglobin A1C Values of Female Physicians - Main Clinic	Mean Hemoglobin A1C Values of Physicians Treating >10 Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values of Physicians Treating <10 Type I Diabetic Patients - Main Clinic	Mean Hemoglobin A1C Values - All Physicians - Satellite Clinics	Mean Hemoglobin A1C Values of Adult (>18) Type I Diabetic Patients - Satellite Clinics	Mean Hemoglobin A1C Values of Child (<18) Type I Diabetic Patients - Satellite Clinics
Hemoglobin A1C Value (%)	8.7	8.6	9.7	8.8	8.1	8.7	8.6	9.7	9.8	9.5

APPENDIX V

1995/1996 Mean Age of Patients with Type I Diabetes

Main Clinic and Satellite Clinics

1995/1996 Mean Age of Patients with Type I Diabetes

Main Clinic and Satellite Clinics

Mean Age of Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	36.77
Mean Age of Patients w/ Type I Diabetes - Main Clinic	36.74
Mean Age of Patients w/ Type I Diabetes - Satellite Clinics	37.06
Mean Age of Children Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	12.86
Mean Age of Children Patients w/ Type I Diabetes - Main Clinic	13.11
Mean Age of Children Patients w/ Type I Diabetes - Satellite Clinics	11.75
Mean Age of Adults Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	41.19
Mean Age of Adults Patients w/ Type I Diabetes - Main Clinic	42.92
Mean Age of Adults Patients w/ Type I Diabetes - Satellite Clinics	45.50

APPENDIX W

1995/1996 Mean Age of Onset for Patients with Type I Diabetes

Main Clinic and Satellite Clinics

1995/1996 Mean Age of Onset for Patients with Type I Diabetes

Main Clinic and Satellite Clinics

Mean Age of Onset for Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	16.48
Mean Age of Onset for Patients w/ Type I Diabetes - Main Clinic	16.36
Mean Age of Onset for Patients w/ Type I Diabetes - Satellite Clinics	17.57
Mean Age of Onset for Children with Type I Diabetes - Main Clinic and Satellite Clinics	6.64
Mean Age of Onset for Children with Type I Diabetes - Main Clinic	7.00
Mean Age of Onset for Children with Type I Diabetes - Satellite Clinics	5.00
Mean Age of Onset for Adults with Type I Diabetes - Main Clinic and Satellite Clinics	18.42
Mean Age of Onset for Adults with Type I Diabetes - Main Clinic	18.01
Mean Age of Onset for Adults with Type I Diabetes - Satellite Clinics	27.10

APPENDIX X

1995/1996 Mean Duration of Type I Diabetes for Patients with Type I Diabetes Main Clinic and Satellite Clinics

1995/1996 Mean Duration of Type I Diabetes for Patients with Type I Diabetes

Main Clinic and Satellite Clinics

Mean Duration of Type I Diabetes - All Patients - Main Clinic and Satellite Clinics	19.99
Mean Duration of Type I Diabetes - All Patients - Main Clinic	20.25
Mean Duration of Type I Diabetes - All Patients - Satellite Clinics	17.79
Mean Duration of Type I Diabetes for Children - Main Clinic and Satellite Clinics	6.23
Mean Duration of Type I Diabetes for Children - Main Clinic	6.11
Mean Duration of Type I Diabetes for Children - Satellite Clinics	6.75
Mean Duration of Type I Diabetes for Adults - Main Clinic and Satellite Clinics	22.70
Mean Duration of Type I Diabetes for Adults - Main Clinic	22.75
Mean Duration of Type I Diabetes for Adults - Satellite Clinics	22.20

APPENDIX Y

1995/1996 Number and Percent of Male and Female Patients with Type I Diabetes Main Clinic and Satellite Clinics

1995/1996 Number and Percent of Male and Female Patients with Type I Diabetes - Main Clinic/Satellite Clinics

Number of Male/Female Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	78 M / 63 F	Percentage of Male/Female Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	55.3% M / 44.4 % F
Number of Male/Female Patients w/ Type I Diabetes - Main Clinic	67 M / 58 F	Percentage of Male/Female Patients w/ Type I Diabetes - Main Clinic	53.6 % M / 45.4 % F
Number of Male/Female Patients w/ Type I Diabetes - Satellite Clinics	11 M / 5 F	Percentage of Male/Female Patients w/ Type I Diabetes - Satellite Clinics	68.8 % M / 31.2 % F
Number of Male/Female Children with Type I Diabetes - Main Clinic and Satellite Clinics	16 M / 6 F	Percentage of Male/Female Children with Type I Diabetes - Main Clinic and Satellite Clinics	72.7 % M / 27.3 % F
Number of Male/Female Children with Type I Diabetes - Main Clinic	12 M / 6 F	Percentage of Male/Female Children with Type I Diabetes - Main Clinic	66.7 % M / 33.3 % F
Number of Male/Female Children with Type I Diabetes - Satellite Clinics	4 M / 0 F	Percentage of Male/Female Children with Type I Diabetes - Satellite Clinics	100 % M / 0 % F
Number of Male/Female Adults with Type I Diabetes - Main Clinic and Satellite Clinics	62 M / 57 F	Percentage of Male/Female Adults with Type I Diabetes - Main Clinic and Satellite Clinics	52.1 % M / 47.9 % F
Number of Male/Female Adults with Type I Diabetes - Main Clinic	55 M / 52 F	Percentage of Male/Female Adults with Type I Diabetes - Main Clinic	51.4 % M / 48.6 % F
Number of Male/Female Adults with Type I Diabetes - Satellite Clinics	7 M / 5 F	Percentage of Male/Female Adults with Type I Diabetes - Satellite Clinics	58.3 % M / 41.7 % F

1995/1996 Number and Percent of Male and Female Patients with Type I Diabetes - Main Clinic/Satellite Clinics

Number of Male/Female Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	78 M / 63 F
Number of Male/Female Patients w/ Type I Diabetes - Main Clinic	67 M / 58 F
Number of Male/Female Patients w/ Type I Diabetes - Satellite Clinics	11 M / 5 F
Number of Male/Female Children with Type I Diabetes - Main Clinic and Satellite Clinics	16 M / 6 F
Number of Male/Female Children with Type I Diabetes - Main Clinic	12 M / 6 F
Number of Male/Female Children with Type I Diabetes - Satellite Clinics	4 M / 0 F
Number of Male/Female Adults with Type I Diabetes - Main Clinic and Satellite Clinics	62 M / 57 F
Number of Male/Female Adults with Type I Diabetes - Main Clinic	55 M / 52 F
Number of Male/Female Adults with Type I Diabetes - Satellite Clinics	7 M / 5 F

Percentage of Male/Female Patients w/ Type I Diabetes - Main Clinic and Satellite Clinics	55.3% M / 44.4 % F
Percentage of Male/Female Patients w/ Type I Diabetes - Main Clinic	53.6 % M / 45.4 % F
Percentage of Male/Female Patients w/ Type I Diabetes - Satellite Clinics	68.8 % M / 31.2 % F
Percentage of Male/Female Children with Type I Diabetes - Main Clinic and Satellite Clinics	72.7 % M / 27.3 % F
Percentage of Male/Female Children with Type I Diabetes - Main Clinic	66.7 % M / 33.3 % F
Percentage of Male/Female Children with Type I Diabetes - Satellite Clinics	100 % M / 0 % F
Percentage of Male/Female Adults with Type I Diabetes - Main Clinic and Satellite Clinics	52.1 % M / 47.9 % F
Percentage of Male/Female Adults with Type I Diabetes - Main Clinic	51.4 % M / 48.6 % F
Percentage of Male/Female Adults with Type I Diabetes - Satellite Clinics	58.3 % M / 41.7 % F