ASSESSING DIABETES KNOWLEDGE, PERCEIVED STANDARD OF CARE, AND

PERCEIVED BARRIERS TO HEALTH CARE AMONG TRUCK DRIVERS WITH

TYPE 2 DIABETES MELLITUS.

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTORATE OF PHILOSOPHY

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF HEALTH SCIENCES

BY

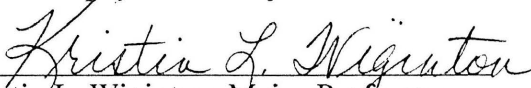ANNE MICHELLE L. PREJEAN M.S.

DENTON, TEXAS

AUGUST 2004

TEXAS WOMAN'S UNIVERSITY
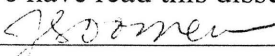DENTON, TEXAS

July 7, 2004

To the Dean of the Graduate School:

I am submitting herewith a dissertation written by Anne Michelle L. Prejean entitled
"Assessing Diabetes Knowledge, Perceived Standard of Care, and Perceived Barriers to
Health Care Among Truck Drivers with Type 2 Diabetes Mellitus." I have examined this
dissertation for form and content and recommend that it be accepted in partial fulfillment
of the requirements for the degree of Doctor of Philosophy with a major in Health Studies.

Kristin L. Wiginton, Major Professor

We have read this dissertation and recommend its acceptance:

Susan Ward

Susan Ward
Department Chair

Accepted Jennifer Martin
Dean of the Graduate School

ACKNOWLEDGEMENTS

ABSTRACT

ANNE MICHELLE L. PREJEAN, M.S.

ASSESSING DIABETES KNOWLEDGE, PERCEIVED STANDARD OF CARE, AND
PERCEIVED BARRIERS TO HEALTH CARE AMONG TRUCK DRIVERS WITH
TYPE 2 DIABETES MELLITUS.

AUGUST 2004

The truck driving industry in the United States employs over 3 million

professional drivers. Drivers who are found to need insulin lose their Commercial

Drivers License (CDL) thus limiting their employment options. This study had three

purposes; to assess the level of diabetes knowledge among truck drivers with and without

type 2 diabetes, to determine to what degree physicians employ the American Diabetes

Association (ADA) standard of care for type 2 diabetes (as recalled by the truck drivers)

and to explore the internet as a research medium. Based on the researcher's professional

experience with truck drivers with type 2 diabetes, this study hypothesized that drivers

did not have enough knowledge about diabetes to either prevent the disease or to control

their disease so to delay or avoid the need for insulin. Diabetes knowledge was measured

with the Diabetes Knowledge Test (DKT) created by the Michigan Diabetes Research

and Training Center. A total of 45 participants completed the DKT, which was made

available on an independent website, www.addaform.com. The type 2 diabetics scored

significantly higher than those without diabetes, $t(42) = 2.31$, $p = .0258$. Diabetic

participants were also able to answer "yes" greater than 50% of the time for 96.7% of the

questions on the three surveys (At the Doctor's Office, Other Doctors Visits, and My Diabetes Plan) related to the ADA standard of care for type 2 diabetes. The internet allowed for a quick data collection (13 weeks), but produced other issues related to IRB approval and accuracy of the data as reported to the researcher by the data collection website.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

The truck driving industry employed 3.3 million professional truck drivers in

2001 (Truck drivers and drivers/sales workers, 2002). Federal law allows truck drivers to

operate up to 10 hours per day, 6 days per week (Regulation 395.1, Federal Motor Carrier

Safety Administration, 1998). Unfortunately, this sedentary lifestyle has resulted in a

majority of professional truck drivers becoming overweight and obese (Roberts & York,

1997), thus placing them at higher risk for developing diabetes mellitus (American

Diabetes Association, 2003).

Since 1939, professional truck drivers with diabetes have been restricted in their

driving in some manner (Federal Highway Administration, Department of Transportation,

49 CFR Part 391, November 25, 1987). Whether that restriction was a total ban or

waiver depended partially on the state of scientific research at the time and, more

significantly on public comment. Once the Commercial Driver's License (CDL) was

introduced in 1986, professional truck drivers typically had to have one to operate large

trucks (Commercial Driver's License Program, 2002). Those drivers whose vehicles are

under a certain weight or do not participate in interstate travel might not require a CDL

and are not the focus of this study. To maintain their CDL, drivers must submit to a

Department of Transportation (DOT) physical every two years. Any of those drivers

determined to need insulin to treat their diabetes lose their CDL. However, with the

1

proper education and treatment, it is possible to live with type 2 diabetes and delay its progression to insulin use for 10 to 15 years (Edelman and Henry, 2002).

Statement of Purpose

The purposes of this study was to determine, through quantitative and qualitative measures, the level of diabetes knowledge possessed by truck drivers with type 2 diabetes and their perceived quality health care, perceived barriers to receiving proper care for their type 2 diabetes, and their perception of to what degree the ADA standard of care for type 2 diabetes was being met.

Research Questions

1. What is the level of diabetes knowledge among the sample of professional truck drivers living with type 2 diabetes?

2. Are professional truck drivers with diabetes receiving the standard of care for diabetes, as outlined by the American Diabetes Association?

3. What are the perceived barriers to health care for type 2 diabetes, as described by the sample of truck drivers?

Hypothesis

There will be no significant difference in scores on the DKT for professional truck drivers with type 2 diabetes from the DKT scores of professional truck drivers without type 2 diabetes.

Delimitations

The delimitations for this study were as follows:

1. This research did not distinguish between interstate and intrastate professional truck drivers, even though there are different regulations for each group.

2. This research did not address other issues which could lead to the loss of the CDL.

Limitations

The limitations for this study were as follows:

1. The participants for this study consisted of a convenience sample recruited from the population who participate on a dedicated truck driving website that self-describe themselves as professional truck drivers with type 2 diabetes mellitus.

2. The participants were requested to complete multiple surveys. All participants completed the main survey, but fewer than half of the participants completed the remaining surveys.

3. The drivers who do access the Internet may differ from those drivers who do not access the Internet in ways undetectable in this study. These factors will cause the results of this study to not necessarily be applicable to the professional truck driving population as a whole.

Assumptions

The assumptions for this study were as follows:

1. Professional truck drivers who possessed a valid CDL completed surveys and follow up materials.

2. The drivers answered all questions honestly.

3

3. The participants read and write in English at a minimum of a sixth grade level.

4. Those participants with type 2 diabetes were referred to, by their physician, and had participated in diabetes education, per the American Diabetes Association standard of care for all newly diagnosed diabetes patients.

5. Participants had barriers that prevented them from receiving the necessary amount of professional diabetic health care to prevent having to use insulin therapy.

Definition of the terms

Body Mass Index (BMI) - The Federal government's official assessment of healthy weight. BMI is measured by multiplying the person's weight by 700, then dividing that number by height in inches twice (American Dietetic Association, 2003).

Borderline diabetes/ Pre-diabetes- Having a fasting blood glucose between 100 mg/dL and 125 mg/dL. Prior to 2001, pre-diabetes was sometimes referred to as borderline diabetes (Joslin Diabetes Center, 2004).

Commercial Driver's License (CDL) - The result of the Commercial Motor Vehicle Safety Act of 1986. A special kind of driver's license which was designed to insure that people driving certain types of vehicles are qualified to drive those vehicles and meet minimum national standards (Commercial Driver's License Program, 2002).

Diabetes Mellitus (DM) - Variable disorder of carbohydrate metabolism caused by a combination of hereditary and environmental factors and usually characterized by inadequate secretion or utilization of insulin, by excessive urine production, by excessive amounts of sugar in the blood and urine, and by thirst, hunger, and loss of weight (Merriam Webster Online Dictionary, 2003). There are two main types of diabetes, type

4

1 and type 2. Type 2 diabetes may be treated by diet, exercise, oral medication and insulin. Type 1 diabetes must be treated with insulin (American Diabetes Association).

Obesity - A condition in which an individual has a BMI above 30 (Weight Management, 2003).

Overweight - A condition in which an individual has a BMI between 27 and 30 (Weight Management, 2003).

Importance of the study

This study was important because it quantified the diabetes knowledge held by professional truck drivers. This was one of the first studies to measure diabetes knowledge in participants that identified themselves as not having diabetes. Even though some participants did not have diabetes at the time, they were at risk of developing diabetes because of the sedentary nature of their jobs. This study also identified that diabetes misinformation was prevalent among the truck driving population.

For participants with type 2 diabetes, this study helped illuminate to what degree the standard of care for type 2 diabetes mellitus was being met by their physicians. The study also identified barriers to health care for the truck driving population. Finally, this study was also important because it added new information to the emerging area of Internet-conducted research.

CHAPTER 2

LITERATURE REVIEW

This literature review will encompass six areas that set the stage for this study. These areas are: diabetes statistics, diabetes education, truck drivers, diabetes and the law, measurement of diabetes knowledge, and the Internet.

Diabetes statistics

According to the Centers for Disease Control and Prevention, there are currently 17 million Americans who have diabetes. At least 11 million people have been diagnosed with diabetes, while the remaining 6 million have diabetes but are undiagnosed. (Centers for Disease Control and Prevention, 2002). By the year 2025, it is projected that the number of diabetics in America will increase to nearly 30 million and the worldwide total will exceed 333 million (International Diabetes Federation, 2003).

The increasing numbers of diabetics worldwide, make diabetes both a deadly and costly disease. In 1999, approximately 450,000 deaths occurred among people with diabetes who were 25 years and older (Centers for Disease Control and Prevention, 2002). This represents about 19% of all deaths in the United States in this particular age group. In 1997, at least $98 billion dollars was spent on direct and indirect related costs of diabetes. The average health care cost for a person with diabetes in 1997 was $10,071, compared with $2,699 for a person without diabetes (Centers for Disease Control and Prevention, 2002).

The explosion of diabetes cases is related not only to the variety of factors that can lead to diabetes but also to more stringent diagnostic criteria. These factors include behavioral, demographic changes, genetics, culture, and socioeconomic status (Healthy People 2010). As part of the Healthy People 2010 initiative, goals have been set to prevent diabetes, increase early diagnosis, increase screening rates for diabetes complications, and decrease morbidity and mortality. Steps have already been taken to reach these goals. For example, in screening and diagnosing diabetes, the acceptable fasting blood glucose level has been decreased from 70 – 110 mg/ dL to 70 – 100 mg/ dL. This diagnostic criteria alteration could result in patients receiving more timely diabetes treatment and education and, thus reduce diabetic complications. These complications could range from heart disease, stroke, high blood pressure, and blindness to kidney disease, nervous system disease, dental disease, and limb amputations (Centers for Disease Control and Prevention, 2002). The Harvard-affiliated Joslin Diabetes Center (2004) recently reported that diabetics can reduce their risk of developing complications by more than 50% if they maintain normal blood sugar levels. Additionally, it is not known if diabetes can be prevented, but modest weight loss (10-15% initial starting weight) and daily exercise (30 minutes minimum) does appear to help delay the onset and help with diabetes control (Joslin Diabetes Center, 2004).

Diabetes Education

The delivery of diabetes education today has been influenced by what Medicare and private insurance companies will reimburse. Typically, a patient can expect a one hour initial assessment by a health care team member and then placement into nine hours

of diabetes education classes. An example of how a diabetes class may be structured would be to divide the 9 class hours into 3 hours each day for 3 days or nights in a row. Another option is to teach 1 all-day class. There is a lack of research evaluating how well this particular class schedule works for the participants.

One primary goal of diabetes education is a reduction in Hemoglobin A1c levels. This goal stems from the findings of the Diabetes Control and Complications Trial (DCCT). The DCCT was a longitudinal study conducted from 1983 to 1993 by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The study involved 1,441 participants at over 29 diabetes centers across the United States and Canada. The participants were randomized into two groups: one labeled standard therapy and the other intensive therapy. The intensive therapy group utilized insulin injections to maintain blood glucose levels as close to normal (70-110 mg/dl). At the conclusion of the study, it was found that maintaining normal blood glucose levels resulted in a 76% reduction in eye disease, 50% reduction in kidney disease and 60% reduction in nerve disease (National Diabetes Information Clearinghouse, 2001). Unlike the results from using a home blood glucose monitor, Hemoglobin A1c levels indicate how well the patient has controlled their blood sugar levels over the past 120 days. Therefore, to have a good Hemoglobin A1c, patients must consistently have good control of their blood sugar levels.

Two compelling arguments for diabetes education in a group setting is that participants report more self-efficacy in their diabetes care and lab results show an improvement in Hemoglobin A1c scores (Bernal, Woolley, Schensul, & Dickinson, 2000;

Rickheim, Weaver, Flader & Kendall, 2002). Other areas of research concerning diabetes education focus on when the patient is having a difficult time attaining control of the disease. These study designs are centered on more contact time with the healthcare professional. One such study had the participants meet with the healthcare team for 12 days in a row (as a group) and for oneindividual session (Keers et al., 2004). Along the lines of increased interaction between participant and health care provider, the Starr County Border Health Initiative study design included 52 contact hours over a 12 month period (Brown, GarciąKouzekanani, & Hanis, 2002). The Starr County study design included 12 weekly meetings and 14 biweekly support group sessions. Each session was 2 hours in length. The educational content for this study was researched for over 6 years before implementation. According to the authors, their approach was, "culturally competent in terms of language, diet, social emphasis, family participation, and incorporation of cultural health beliefs." Even with all this attention to detail, at the end of the year, there was actually an increase in the average Hemoglobin A1c levels, from 10.6% to 10.89%. Current research has focused on what can (or cannot) be accomplished in what is probably an unreasonable amount of health education time in the real world instead of evaluating what can be accomplished in less ideal (but more realistic) situations.

Truck drivers

The University of California at Irvine reported that the top profession for both African American and Latino men was truck driving (Top 10 Occupations by Race/Ethnicity and Gender, 1998). African Americans, Hispanic/Latino Americans,

9

American Indians, and some Asian Americans and Pacific Islanders are at particularly high risk for type 2 diabetes (Centers for Disease Control and Prevention, 2004.)

The exclusion of insulin-dependent truck drivers was based on data that implicated hypoglycemia among diabetic truck drivers and the occurrence of road accidents (LaPorte, 1991). Therefore, prior to September, 2003, truck drivers who were diagnosed as having diabetes mellitus (insulin-dependent or insulin-requiring) were automatically disqualified, regardless of how well the disease was controlled (Pommerenke, Hegmann, & Hartenbaum, 1998).

During 1993-94, when waivers were granted to drivers, studies were conducted that matched the medical records and crash records of the waiver-holders and others with diabetes with the medical and crash records of healthy drivers. Results from one such study (Labege-Nadeau et al., 2000) indicated an increased crash risk for drivers with "uncomplicated diabetes" but no greater crash risk for drivers using insulin. During this same time, Sue Roberts of Sue Roberts Health Concepts, conducted two focus groups with truck drivers and completed a review of wellness programs in the trucking industry. Of 23 trucking companies interviewed, only 6 had wellness programs. Furthermore, these wellness programs were mostly utilized by corporate office staff. The highest percentage of drivers reached by any such program was 10% (Roberts, 1997).

A more recent study did determine that diabetics (both professional and non-professional drivers) using insulin had more crashes in the prior two-year period than drivers without diabetes or drivers with diabetes but not using insulin (Cox et al., 2003). Prior studies were conducted before the results of the DCCT were known. The DCCT

10

showed that intensive diabetes therapy resulted in the fewest complications. Unfortunately, one of those complications, hypoglycemia, is exacerbated by intensive diabetes therapy (National Diabetes Information Clearinghouse, 2001). This study also sought to determine if there was a difference between type 1 and type 2 diabetics in regards to driving. The study's goals were to assess the impact of diabetes and diabetic treatment on driving and to identify factors that predict driving accidents. Participants were recruited from 13 sites in 7 cities in the United States and 4 cities in Europe. Seventy-five participants were recruited from each site: 25 with type 1 diabetes, 25 with type 2 diabetes and 25 spouse controls. The participants were asked 8 questions related to hypoglycemia and driving. Example questions were:

1. How many automobile accidents did you have in the last 2 years?

2. Is there a blood glucose level at which you would not drive (yes/no)? If yes, what level?

The study revealed that one factor related to driving accidents were participants not measuring their blood sugar levels before driving. Another crash-related factor was from participants who would let their blood sugar drop lower (than the level when they originally felt hypoglycemic) before discontinuing driving. The most interesting finding may be of help to professional truck drivers with type 2 diabetes. These participants had no increased incidence of driving accidents when compared to the spouse controls, regardless of insulin or oral medication use. Even type 2 diabetes participants who were taking 2 shots of insulin per day had no difference in crash rates.

What is not mentioned in either study is that hyperglycemia can also cause a person to lose consciousness. Additional research related to the health issues of truck drivers have addressed sleep apnea, infectious diseases and hearing loss (Hannerz & Tuchsen, 2001; Seshagiri, 1998; Stoohs, Bingham, Guilleminault & Dement, 1995), but no study to date has addressed the issues of diabetes knowledge, standard of care and access to health care for the truck driver.

Diabetes and the law

The laws regarding diabetes and truck drivers have been through many changes throughout the past several decades. The first regulation concerning diabetics was enacted in 1939 by the Department of Transportation. All commercial drivers were required to do a urine glucose test as part of their physical. A driver who did not pass was excluded from commercial driving. In 1970, the relevant regulation (49 CFR 391.41) was updated to state that a, "person is physically qualified to drive a motor vehicle … if he has no established medical history or clinical diagnosis of diabetes mellitus currently requiring insulin for control" (Federal Motor Carrier Safety Administration, 2001). According to the Federal Highway Administration (FHWA), this regulation was created because of studies that indicated diabetic drivers had a higher rate of accidents than non-diabetic drivers (Federal Motor Carrier Safety, 2001)

In 1977, the FHWA issued an advance notice of proposed rulemaking to receive public comment on changing the 1970 law. The public comment was overwhelmingly against changing the 1970 law. Even the American Diabetes Association (ADA) agreed with the policy that insulin-requiring diabetics should not operate commercial vehicles.

12

By 1986 though, the ADA had changed its position and petitioned the FHWA for a change to the 1970 law. The ADA's new position stated that technology and advances in diabetes management knowledge would allow for better control of insulin-requiring diabetes. Specifically, the ADA petitioned that waivers be allowed on a case-by-case basis (Federal Motor Carrier Safety, 2001). The FHWA instituted a program to study the impact of insulin dependent diabetes on driving safety, the results of which were published in the 1991 report, *Insulin-Using Commercial Motor Vehicle Drivers*. Based on the results of this study, the FHWA promulgated regulations in 1993, allowing waivers from the physical condition requirements for insulin-dependent drivers meeting certain criteria (LaPorte, 1991). The waiver program would be short-lived. The D.C. Circuit Federal Appeals Court determined in Advocates for Highway and Auto Safety v. Fed. Hwy. Admin., 28 F. 3d 1288 (D.C. Cir. 1994), that the waiver program exceeded the FHWA's statutory authority because the FHWA had failed to demonstrate that the waiver program did not negatively impact safety. Although the FHWA had to end the waiver program, there was sufficient data on those who were driving under existing waivers to demonstrate no negative impact on the overall safety of the federal highways. Accordingly, the FHWA passed a "grandfather" rule in 1996 allowing drivers with valid waivers under the previous program to continue driving under those waivers (61 Fed. Reg. 606, 1996; 61 Fed. Reg. 13338, 1996).

Congress revisited the issue of waivers for the insulin-dependent diabetes restriction in the 1998 Transportation Equity Act for the 21st Century (TEA). The TEA somewhat broadened the Department of Transportation's (DOT) authority to grant

exemptions from physical requirements and requested the DOT to undertake a study to determine if a waiver program that met the new requirements could be developed for insulin-dependent diabetics (49 U.S.C.S. §§ 31136, 31315 (Law. Co-op. 2004)). The DOT conducted that study and provided the results to Congress in *A Report to Congress on the Feasibility of a Program to Qualify Individuals with Insulin Treated Diabetes Mellitus to Operate Commercial Motor Vehicles in Interstate Commerce as Directed by the Transportation Equity Act for the 21st Century* (Federal Motor Carrier Safety Administration, 2000). Using the results of the study, the Federal Motor Carrier Safety Administration (FMCSA) proposed and adopted a rule, effective September 2003, allowing insulin-dependent diabetics who meet the requirements of the new rule to apply for waivers (66 Fed. Reg. 39548, 2001; 68 Fed. Reg. 52241, 2003). To date, all of those applications have been denied (69 Fed. Reg. 15433, 2004).

Measurement of Diabetes Knowledge

There are many ways to measure diabetes knowledge and yet, there are few studies that have actually done so. The Diabetes Knowledge Test (DKT) was created by the Michigan Diabetes Research and Training Center and is offered as a free instrument (Fitzgerald et al., 1998). The DKT tests participants on carbohydrate content of food, general diabetes knowledge, diabetic complications and different scenarios that may result in a change in blood sugar. The DKT was written for a sixth grade reading level. The content of these questions concerns the most basic knowledge that a diabetic must master to maintain control of their diabetes on a daily basis. Truck drivers who do not know the answers to the DKT and cannot put their diabetes knowledge into practice, have

very little chance of avoiding the use of insulin or of achieving adequate diabetic control to be granted a waiver. In developing the DKT, the instrument was tested with a demographically diverse sample that received diabetes education in different settings. Their type 2, non-insulin using diabetics scored an average of 65.65% (SD = 18.98). The DKT was determined to be reliable at Cronbach alpha greater or equal .70 (Fitzgerald et al., 1998). The developers also discovered that diabetics with more years of education or who had completed formal diabetes education also scored higher on the DKT. Studies (Murata, et al., 2003; West & Goldberg, 2002) involving veterans confirm some of these findings.

Results from one study indicated that DKT scores were related to race, age and education level (West & Goldberg, 2002). In that study, Non-Caucasians scored 10% lower than Caucasians. As patient's age increased by 10 years, DKT scores dropped by 3%, while higher educational levels resulted in higher DKT scores. Additionally, results from this study indicated the longer patients had diabetes, the more they thought they knew about the disease. Their DKT scores did not correlate with that assumption. Unfortunately, the gold-standard test of diabetes control, the Hemoglobin A1C level, did not have an association with DKT scores (West & Goldberg, 2002).

Another study with veterans and the DKT found that participants tended to miss the same questions (Murata et al., 2003). For example, 68% missed the question, "which of the following is highest in fat: low fat milk, orange juice, corn or honey." The correct answer is "low fat milk", but 43% answered that corn was higher in fat. Fifty-eight percent missed, "Which of the following is a free food:" Any unsweetened food, any

15

dietetic food, any food that says "sugar free" on the label and any food that has less than 20 calories per serving. The correct answer is the last choice. Other questions in which over 50% of the participants missed concerned Hemoglobin A1C and carbohydrate content of food. Around 40% of participants incorrectly identified how to treat low blood sugar and did not know that unsweetened fruit juice would raise their blood sugar (Murata et al., 2003). New ways must be sought to impart and assess knowledge in hard to reach populations. The Internet may just provide the medium necessary to achieve these goals.

The Internet and research

It is impossible to know how many people use the Internet; however, researchers have attempted to quantify this information. It was estimated that by mid-year 1994, 20 million individuals would be using the Internet in the United States. Predictions were that Internet use would double by the same time in 1995 (Civille, 1995). Recent research indicates the Internet now has over 50 million users in 80 different countries (Gonzalez, 2002).

A study published in the *Journal of the American Medical Association* indicates that approximately 40% of respondents with Internet access utilize the Internet for researching health information (Baker, Wagner, Singer, & Bundorf, 2003). Further research reveals that, among American citizens who regularly access the Internet, Caucasians participate in Internet health research more often than African-Americans or Asians (U.S. Department of Labor – Bureau of Labor Statistics, 2001). What is not yet known is the quality of the health information these respondents are receiving.

16

With millions of people using the Internet and with so much information available, it is only natural the Internet would become a medium for research. Truck drivers are a unique population whose members might be more easily accessed through the Internet. Some challenges that arise when trying to develop an internet-based scientifically sound research project are: privacy, informed consent, sampling and methodology (Gonzalez, 2002; Pittenger, 2003). Advantages of such a research project include: ease of distribution, potentially large numbers of participants, shorter time needed for data collection and ability to recruit unique populations (Barak & English, 2002).

In studying a distinctive population, such as truck drivers with type 2 diabetes, assessing their level of knowledge concerning their diabetes care seems like a logical start to any future health education endeavors within this population.

CHAPTER 3

METHODOLOGY

Truck drivers spend many hours on the road, often making truck stops their home-away-from-home and other drivers their second family. One way these drivers communicate is through internet discussion boards. On the discussion boards, drivers swap stories and seek information on a variety of topics. Not all drivers use the internet, but nevertheless, the internet may become just one more way to access a hard to reach population. Part of this research was an exercise in just how many participants could be reached via the internet and to discover the issues that accompany this method of data collection. The other components of this research dealt with assessing diabetes knowledge among truck drivers and determining to what degree they received the ADA standard of care for type 2 diabetes from their physicians.

Population and Sample

During March 2004, 45 participants were recruited via a message posted on discussion boards available on www.trucknet.com (see Appendix A for content of discussion board study-recruitment message). According to trucknet.com data, their user population consisted of over 13,000 professional truck drivers. To be included in the study, participants clicked on the provided website links. These links brought the participant to an independent website, www.addaform.com. At this website, participants

were able to complete the instruments and their responses were emailed to the principal investigator without any identifying information.   The demographics of the sample were not collected, beyond asking if the participant had diabetes or not. Of the 45 participants, 22 reported they had type 2 diabetes, 16 reported they did not have type 2 diabetes, 6 reported they were told they were borderline and 1 reported as pre-diabetic.

Protection of Human Participants

The discussion of diabetes is considered a very sensitive subject among professional truck drivers. For this reason, truck drivers were recruited from a discussion board within trucknet.com that dealt specifically with medical issues. The participants were already visiting this portion of the website to discuss personal health issues. A second protection provided to participants was that the surveys were completed at a website independent from trucknet.com and independent from the principal investigator. Concerning internet security, the principal investigator requested that addaform.com not track IP addresses. Results received by the principal investigator were saved under password security on a home computer.

Data Collection Procedures

After receiving IRB approval, the recruitment message was posted in the medical forum of trucknet.com. Periodically, the principle investigator would return to the recruitment message and add a reply message to keep the recruitment message at the top of the message board list. This reply message thanked participants for filling out the survey and stated that there was still time to complete the surveys if other potential

participants would like to do so. It took 13 weeks to collect the sample, with the majority of responses (32) being received by the 9th week.

Instrumentation

A total of five surveys were utilized for this project. These surveys are: the Diabetes Knowledge Test (DKT), At the Doctor's Office (ADO), Other Doctor's Visits (ODV), My Diabetes Plan (MDP) and The Final Say (TFS).

The (DKT) was developed by the Michigan Diabetes Research and Training Center (MDRTC). The DKT contains 14 multiple choice questions based on information the researchers at MDRTC determined all type 2 diabetics should know. The DKT has been piloted and revised over several years prior to being used for this evaluation. For this final form, reliability was measured using parallel forms reliability and internal consistency with a Cronbach's alpha of greater than or equal to .70. Please see Appendix B for test reliabilities. Based on patient information, the MDRTC was able to predict how these patients would score on the DKT, thus providing criterion-related validity (Fitzgerald et al., 1998). Permission for its use was obtained by the principle investigator. Please refer to Appendices C and D for a copy of the Diabetes Knowledge Test by the Michigan Diabetes Research and Training Center and the permission for its use webpage.

The additional instruments asked for a 'yes', 'no' or 'don't remember' response to questions based on the American Diabetes Association (ADA) standard of care for adult, type 2 diabetes patients. For example, a question from the At the Doctor's Office (ADO) survey is: During your first visit to your doctor after being told you had type 2 diabetes, did the following happen by either the doctor, nurse, or other office staff:

| Someone looked at my feet? | Yes | No | Don't Remember |
| Someone measured my blood pressure? | Yes | No | Don't Remember |

The other surveys with 'yes,' 'no,' or 'don't remember' answers are titled: Other Doctor Visits (ODV) and My Diabetes Care Plan (DCP).

The qualitative portion of the survey, entitled, The Final Say (TFS), asked participants about their internet usage and asked them to identify their barriers to healthcare. Please refer to Appendix E for a copy of the ADA standard of care. Please refer to Appendices F, G, H and I for copies of the additional instruments and the qualitative instrument. Participants only had to fully complete the DKT to be included in the study.

Data Analysis

Data was entered into SAS by the principle investigator. The statistics calculated were frequencies, Mann-Whitney U, O'Brien's Test for Homogeneity of Score Variance, and *t* Test.

Summary

While finding information on the Internet is only slowed by the computer connection speed, conducting research utilizing the Internet can be more time consuming than expected. IRB approval was only granted after three attempts. The major delays at IRB concerned internet-security and protection of participants' personal medical information. Approval was granted after revision of the participant recruitment message and the researcher requesting that addaform.com not track IP addresses. Once data collection commenced, there were fewer participants than expected, and it took longer

than anticipated to collect the minimum acceptable sample. The website, addaform.com kept up-to-date frequencies for each question. However, addaform.com had a glitch which caused it to count one of the surveys as being from a non-diabetic, when it was actually completed by a type 2 diabetic. What should have saved time actually caused more time to be spent in reviewing each survey response to make sure it was tallied in the correct column. This emerging research medium has room for improvement, which should occur through additional research methodology involving the Internet for data collection.

CHAPTER 4

RESULTS

A total of 45 participants completed at least one of the five surveys available at www.addaform.com. This section will review the results of the DKT, ADO, ODV, DCP, and TFS.

Diabetes Knowledge Test (DKT)

All 45 participants completed this survey. Of the 45, 22 reported type 2 diabetes; 16 reported not having any type of diabetes; 6 reported they were borderline diabetics and 1 reported as being pre-diabetic. The average scores on the DKT for the four groups are depicted in Table 1.

Table 1

DKT scores by group

	type 2 dm	no dm	borderline	pre diabetic
N	22	16	6	1
Mean	10.5909	8.6875	9.3333	8.0000
Median	11.0000	9.0000	9.5000	8.0000
Std. Deviation	2.17473	3.02696	1.96638	

In reviewing the mean DKT score for each group, the type 2 diabetics scored higher than all other groups. The next highest mean (in descending order) was the borderlines, the non-diabetics and the pre-diabetic.

The Mann Whitney U was conducted for two groups: the type 2 diabetics and the non-diabetics plus the borderline diabetics. The borderline diabetics were added to the non-diabetics because of the researcher's assumption that these participants believed they still did not have diabetes. A second reason for this combination was that there were not enough of the borderlines to form a group that would allow for a powerful enough statistics test. The result, $Z = 2.3008$, $p = 0.0214$, indicates that these two groups come from two different populations. Unfortunately, that is all the Mann Whitney U is capable of determining.

The O'Brien's Test for Homogeneity of score Variance result was: $F(1,42) = .84$, $p = .3648$. This lack of significance indicated that the variances in the two groups are likely to not be different. This means that even though the sample is not randomly selected, or otherwise to be considered normal, the t-test can be utilized with some confidence in the results.

The t-test for independent samples resulted in the score, $t(42) = 2.31$, $p = .0258$, thus indicating the type 2 diabetes group scored significantly higher on the DKT test than the non-diabetics and borderline diabetics combined. The single participant who selected pre-diabetes was not placed in either of the groups because no logical assumption could be determined as to which of the two groups this person should be placed.

Results on Individual Questions:

Please see Appendix B for the entire DKT with correct answers.

Table 2

Selected DKT questions, correct answers and answer frequency

Number	Question content	Choices	Answer frequency	Percent
2	Which of the following is highest in carbohydrate?	Baked chicken	0	0%
		Swiss cheese	5	11%
		Baked potato *	31	69%
		Peanut butter	9	20%
3	Which of the following is highest in fat?	Low fat milk *	23	51%
		Orange juice	4	9%
		Corn	14	31%
		Honey	4	9%
4	Which of the following is a "free food"?	Any unsweetened food	14	31%
		Any dietetic food	7	16%
		Any food that says "sugar free" on the label	0	0%
		Any food that has less than 20 calories per serving *	19	42%
5	Glycosylated hemoglobin (hemoglobin A1c) is a test that is a measure of your average blood glucose level for the past:	Day	16	36%
		Week	5	11%
		6 – 10 weeks *	14	31%
		6 months	10	22%
7	What effect does unsweetened fruit juice have on blood glucose?	Lowers it	6	13%
		Raises it *	36	80%
		Has no effect	3	7%

Continuation of Table 2

8	Which should not be used to treat low blood glucose?	3 hard candies	5	11%
		½ cup of orange juice	3	7%
		1 cup diet soft drink *	27	60%
		1 cup skim milk	10	22%
10	Infection is likely to cause:	An increase is blood glucose *	24	53%
		A decrease in blood glucose	7	16%
		No change in blood glucose	14	31%

Note. Correct answers are indicated by *.

At the Doctor's Office (ADO)

A total of 13 participants answered this survey. This survey sought to find out to what degree participants were receiving the standard of care for type 2 diabetics, as defined by the American Diabetes Association. In particular, this survey asked about the participants' first visit to the doctor after they were diagnosed with type 2 diabetes. Ideally, the answer to each question would be 100%. Actual results are depicted in Table 3.

Table 3

Frequencies for the ADO survey

Number	Question	Possible responses	Response frequency	Percent
1	Someone measured my height and weight	Yes	13	100%
		No	0	0%
		Don't remember	0	0%
2	Someone measured my blood pressure	Yes	13	100%
		No	0	0%
		Don't remember	0	0%

Continuation of Table 3

3	Someone looked into my eyes	Yes	9	69.2%
		No	4	30.8%
		Don't remember	0	0%
4	Someone asked me if I had any problems seeing	Yes	11	84.6%
		No	2	15.4%
		Don't remember	0	0%
5	I was referred to an eye doctor for a dilated eye exam	Yes	7	53.8%
		No	6	46.2%
		Don't remember	0	0%
6	Someone looked in my mouth	Yes	10	76.9%
		No	3	23.1%
		Don't remember	0	0%
7	Someone asked about my dental care	Yes	7	53.8%
		No	5	38.5%
		Don't remember	1	7.7%
8	Someone felt my neck	Yes	8	61.5%
		No	3	23.1%
		Don't remember	2	15.4%
9	Someone felt my thyroid gland	Yes	9	69.2%
		No	2	15.4%
		Don't remember	2	15.4%
10	Someone checked my liver	Yes	8	61.5%
		No	3	23.1
		Don't remember	2	15.4%
11	Someone felt my abdomen	Yes	10	76.9%
		No	3	23.1%
		Don't remember	0	0%
12	Someone checked my other organs	Yes	6	46.2%
		No	4	30.8%
		Don't remember	3	23.1%

13	Someone took my pulse	Yes	13	100%
		No	0	0%
		Don't remember	0	0%
14	Someone looked at my hands and fingers	Yes	10	76.9%
		No	1	7.7%
		Don't remember	2	15.4%
15	Someone listened to my heart and lungs with a stethoscope	Yes	13	100%
		No	0	0%
		Don't remember	0	0%
16	Someone looked at my bare feet	Yes	10	76.9%
		No	3	23.1%
		Don't remember	0	0%
17	Someone checked my feet for feeling and pulses	Yes	10	76.9%
		No	3	23.1%
		Don't remember	0	0%
18	Someone tested my reflexes	Yes	11	84.6%
		No	2	15.4%
		Don't remember	0	0%
19	Someone took my blood for tests	Yes	12	92.3%
		No	1	7.7%
		Don't remember	0	0%
20	Someone took urine samples for tests	Yes	9	69.2%
		No	4	30.8%
		Don't remember	0	0%
21	Someone asked how and when I was diagnosed with diabetes	Yes	8	61.5%
		No	5	38.5%
		Don't remember	0	0%
22	Someone asked for lab results for tests I had in the past	Yes	4	30.8%
		No	7	53.8%
		Don't remember	2	15.4%

23	Someone asked about my eating habits	Yes	9	69.2%
		No	3	23.1%
		Don't remember	1	7.7%
24	Someone asked about my weight history	Yes	8	61.5%
		No	3	23.1%
		Don't remember	2	15.4%
25	Someone asked about my current diabetes treatment plan	Yes	7	53.8%
		No	5	38.5%
		Don't remember	1	7.7%
26	Someone asked how often and how hard I exercise	Yes	11	84.6%
		No	2	15.4%
		Don't remember	0	0%
27	Someone asked if I've had low blood sugars	Yes	4	30.8%
		No	7	53.8%
		Don't remember	2	15.4%
28	Someone asked about infections I've had	Yes	7	53.8%
		No	4	30.8%
		Don't remember	2	15.4%
29	Someone asked about complications I've had and what treatments I've received for them	Yes	7	53.8%
		No	5	38.5%
		Don't remember	1	7.7%
30	Someone asked what medicines I am taking	Yes	12	92.3%
		No	1	7.7%
		Don't remember	0	0%
31	Someone asked if I smoke	Yes	12	92.3%
		No	1	7.7%
		Don't remember	0	0%
32	Someone asked if I have high blood pressure	Yes	10	76.9%
		No	3	23.1%
		Don't remember	0	0%

Continuation of Table 3

33	Someone asked about my cholesterol levels	Yes	9	69.2%
		No	2	15.4%
		Don't remember	2	15.4%
34	Someone asked about my family history	Yes	12	92.3%
		No	1	7.7%
		Don't remember	0	0%
35	Someone asked about other medical problems I have had	Yes	12	92.3%
		No	1	7.7%
		Don't remember	0	0%
36	Someone asked if other family members have diabetes	Yes	11	84.6%
		No	1	7.7%
		Don't remember	1	7.7%

Other Doctor's Visits (ODV)

A total of 12 participants completed this survey. Similarly to ADO, this survey also sought to find out to what degree participants were receiving the standard of care for type 2 diabetics. However, the focus of this survey was participants' follow up doctor visits for diabetes management. Results are depicted in Table 4.

Table 4

Frequencies for ODV survey

Number	Question	Possible responses	Response frequency	Percent
1	Someone asked about how often I've had high or low blood sugars	Yes No Don't remember	7 5 0	58.3% 47.7% 0%
2	Someone asked to see my blood sugar records	Yes No Don't remember	7 5 0	58.3% 41.7% 0%
3	Someone asked what changes I've made to my diabetes care plan	Yes No Don't remember	5 6 1	47.7% 50% 8.3%
4	Someone asked what problems I've had following my diabetes care plan	Yes No Don't remember	6 5 1	50% 41.7% 8.3%
5	Someone asked about symptoms that might mean I am getting diabetes complications	Yes No Don't remember	6 6 0	50% 50% 0%
6	Someone asked about what illnesses I had since the last visit	Yes No Don't remember	9 2 1	75% 16.7% 8.3%
7	Someone asked what medicines I am taking now	Yes No Don't remember	12 0 0	100% 0% 0%
8	Someone asked if my life changed in any way	Yes No Don't remember	6 6 0	50% 50% 0%

9	Someone measured my weight	Yes	12	100%
		No	0	0%
		Don't remember	0	0%
10	Someone measured my blood pressure	Yes	12	100%
		No	0	0%
		Don't remember	0	0%
11	Someone looked into my eyes	Yes	10	86.3%
		No	2	13.7%
		Don't remember	0	0%
12	Someone looked at my feet	Yes	6	50%
		No	6	50%
		Don't remember	0	0%
13	Someone took blood to test my hemoglobin A1c	Yes	12	100%
		No	0	0%
		Don't remember	0	0%
14	Someone reviewed my treatment plan to measure my progress	Yes	6	50%
		No	6	50%
		Don't remember	0	0%

My Diabetes Plan (MDP)

A total of 9 participants completed this survey. This survey asked participants about their individual diabetes management plan created by them and their diabetes care team. The results of this survey are depicted in Table 5.

Table 5

Frequencies for MDP survey

Number	Question	Possible responses	Response frequency	Percent
1	My plan has a list of short term goals	Yes No Don't remember	6 3 0	66.7% 33.3% 0%
2	My plan has a list of long term goals	Yes No Don't remember	7 2 0	77.8% 22.2% 0%
3	My plan lists the medicines I use to control my diabetes	Yes No Don't remember	7 2 0	77.8% 22.2% 0%
4	My plan includes eating advice from a dietitian	Yes No Don't remember	7 2 0	77.8% 22.2% 0%
5	My plan includes a list of changes I intend to make to take charge of my health	Yes No Don't remember	7 2 0	77.8% 22.2% 0%
6	My plan includes classes for me and my family on taking care of my diabetes	Yes No Don't remember	2 7 0	22.2% 77.8% 0%
7	My plan includes seeing an eye doctor	Yes No Don't remember	6 3 0	66.7% 33.3% 0%
8	My plan includes seeing a foot doctor	Yes No Don't remember	1 8 0	11.1% 88.9% 0%
9	My plan includes instructions on when to come back to my primary doctor	Yes No Don't remember	7 1 1	77.8% 11.1% 11.1%

10	My plan includes instructions on when to call my primary doctor	Yes	7	77.8%
		No	2	22.2%
		Don't remember	0	0%
11	My plan includes seeing a dentist	Yes	4	44.4%
		No	4	44.4%
		Don't remember	1	11.1%
12	My plan includes information on what to do when I am sick	Yes	2	22.2%
		No	7	77.8%
		Don't remember	0	0%

The Final Say (TFS)

A total of 12 participants responded to the qualitative portion of this study. This survey was designed to find out qualitative information regarding the participants' internet usage and their personal barriers to health care.

Question 1. When was the last time you visited the doctor for your diabetes?

Time frame for last doctor visit:	Number of Participants
Within the last week	2
2 weeks ago	2
1 month ago	3

3 months ago	1
4 – 6 months ago	2

"April 2nd, 2004. This is the date where he told me I have type 2."

<u>Question 2</u>. How many times in a year do you see your doctor for your diabetes?

Number of Doctor visits in a year	Number of Participants
2 times a year	5
3 – 4 times a year	5
6 – 8 times a year	1
10 – 12 times a year	1

Question 3. Prior to getting diabetes, did you think you were at high risk for getting diabetes?

66.7% yes

33.3% no

Question 4. When looking for information on diabetes – where do you look?

Where do you look for diabetes information?	Number of Participants
Internet	8
Doctor	2
Dietitian/ Nutritionist	2
Magazines	2
American Diabetes Association	1
Insurance Company	1

Continuation of Question 4

Library	1
Don't know	1

Question 5. What role has the internet, email and discussion boards played in how you take care of your diabetes?

Role of internet	Number of Participants
Information (diet/ treatment)	7
Email	1
None	4

Specific responses:

1. "It has served me well as a source of information on treatment and diet"

2. "constant reminder how important it is to have strict control"

Question 6. List some of the things you do when you are on the internet.

Specific responses:

"In order: communicate (e-mail), look for info on specific subjects, play yahoo

games, general explore, on-line purchases"

"read recipes, read truck.net chat with othr truck drivers"

"surf the trucker websites"

"Check e-mail, usenet groups, discussion boards, and web surf"

"Post on a few message boards that I participate in"

" search for recipes and information for weight loss."

"surf"

"research and surfing and looking for a trucking job"

"mainly browse"

"Surf and lurk the trucking forums"

Question 7. How long have you used the internet?

The answers ranged from 1 – 8 years, with the mode being 5 years.

Question 8. Can you think of anything that would make it easier for you to take care of

your diabetes?

Specific responses:

"Majic weight loss"

"being able to stick to a rigid diet plan and eat at exact times each day"

"Simpler, cheaper, less painful glucose meters"

"not having it would be the easiest of all. But I am thankful that I have a

great doctor and dietician that have answered my questions and help me learn how to better manage."

"not to have to take care of it ha ha"

"being able to offord the meds and testing supplies"

"healthier food available on the road since I am a truck driver"

"Just tastier food for us"

"Probably not be in trucking"

Question 9. List 5 things that prevent you from getting the healthcare you need. Specific responses:

"not at home on road, irregular meal times, high fat foods, snacks"

"1 no insurance, 2 OTR truck driver, 3 High costs of medical care"

"Lack of insurance, Money needing to go to other places, lack of time, forgetfulness, not being in the area when I need to be."

"lack if insurrance mainly and confidence in the drs an this country because we have some quaks in this country not having access to the right foods that i need and lack of cash when i need cash"

"money"

"cost,no benifits,no insurance,cost,cost"

"cost of medicine, cost of supplies"

"gone from home, money, good insurance, lazy"

<u>Question 10</u>. Any other comments.

"People are too damn lazy and want things done 'by others'."

"Make sure your family knows it is an inherant illness. my father never told

me he had it. I have my kids ans Grandkids checked at least once a year"

Conclusion

The results for each survey included both expected outcomes and surprising

outcomes. The following chapter will include a discussion of the research questions and

in-depth analysis of each of the 5 surveys: DKT, APO, OPV, MDP and TFS. The chapter

will conclude with discussion on ideas for future research.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

There were four purposes to this study and one unexpected benefit. The most important purpose for this study was to determine the diabetes knowledge of a sample of truck drivers with type 2 diabetes. The second purpose for this study was to determine the degree to which the ADA standard of care for type 2 diabetes was being met. The third goal of this study was to discover some of the barriers faced by these truck drivers in trying to manage their diabetes. The final aim of this study was to utilize the internet in an innovative way: for participant recruitment and data collection. The four purposes of the study were met, but in the process, this investigation opened up many other avenues to explore in the areas of diabetes knowledge, education and use of the internet for research. The unexpected benefit was that this review of literature contains a comprehensive timeline of the legislation regarding professional truck drivers and diabetes.

Summary

Forty-five participants completed at least one of the surveys available at www.addaform.com. The participants were placed in groups which were determined by what they reported as their diabetes status. Twenty-two reported they had type 2 diabetes, sixteen reported they did not have type 2 diabetes, six reported they had been told they were borderline, and one reported as pre-diabetic.

41

The sample was recruited through an online discussion board at www.trucknet.com. A recruitment message was posted in an area of the discussion board dedicated to health issues. It took approximately 13 weeks to collect the sample. The researcher posted additional messages to keep the original recruitment message at the top of the message list.

The data consisted of both quantitative and qualitative data. The quantitative data was entered into SAS. The qualitative data was reported verbatim.

Conclusion

Research Questions

1. What is the level of diabetes knowledge among the sample of professional truck drivers living with type 2 diabetes?

In this sample, the professional truck drivers with type 2 diabetes correctly answered 76% of the questions on the DKT. The percentage correct is higher for these drivers than participants' scores in other studies that have utilized the DKT and significantly ($P = 0.01$) higher than the non diabetics and borderlines in this study (Fitzgerald et al, 1998; Murata et al, 2003; West & Goldberg, 2002).

2. Are professional truck drivers with diabetes receiving the standard of care for diabetes, as outlined by the American Diabetes Association?

Participants were able to answer "yes" greater than 50% of the time for 96.7% of the questions on the three surveys (ADO, ODV, MDP) related to the ADA standard of care for type 2 diabetes.

3. What are the perceived barriers to health care for type 2 diabetes, as described by the sample of truck drivers?

The number one barrier to health care for type 2 diabetes, for this sample of truck drivers, is cost. The next most reported barrier was being on the road for extended periods of time. The hypothesis, that there will be no significant difference in scores on the DKT for professional truck drivers with type 2 diabetes from the DKT scores of professional truck drivers without type 2 diabetes, is rejected.

Discussion and Implications

This section will include discussion on each instrument in order: DKT, ADO, ODV, MDP, and TFS. It will conclude with a discussion of the process of internet based research.

Diabetes Knowledge Test

Drivers with type 2 diabetes scored higher than the drivers without diabetes. While this result was unexpected, it is a desirable result in that it may indirectly indicate that these participants completed the diabetes education that their physician should have provided for him. Another unexpected result of the research was the number of participants who reported they were "borderline". The term "borderline" is no longer in use by the ADA. It would have been interesting to question these participants further. Specifically, the researcher is left wondering if these participants were seeing a physician who was not up-to-date on the latest terminology, or if they had not been back to the physician in a long time out of fear of finally getting a true diabetes diagnosis. The "borderline" participants scored better than the "no dm" participants, but worse than the

43

"type 2 dm" participants. What is unfortunate about this outcome is that it may mean these participants do not have enough knowledge to prevent diabetes and possibly still believe they do not have the disease. According to the ADA (2004), over 5.2 million people in the United States do not know they have diabetes, while at the same time, the disease is damaging their heart, eyes, nerves and kidneys.

Turning now to the results of particular questions, the answers to questions 2, 3, and 4, are similar to what was found by Murata, et al. (2003). The disturbing part is that knowledge of the correct answers to these three questions is crucial to understanding how foods affect blood sugar and, thus, diabetic control. The correct answer to question 5 (6 – 10 weeks) is somewhat surprising since the American Diabetes Association actually defines the Hemoglobin A1c as a measure of a person's blood glucose control over 2 – 3 months. A fact sheet about the Hemoglobin A1c from the MDRTC confuses the matter even more. In this sheet, they first claim, "…the HbA1c level is in part affected by blood sugar levels over a 3-month period. However, it mainly represents levels over the past month and is heavily weighted to the past 2 weeks." The next paragraph then states, " It is a simple way to evaluate average glucose levels over the past 2-4 weeks." (Michigan Diabetes Research and Training Center, 2003).   The real question then is, is it really important that patients understand this much detail about the tests they have done or that they just know they should have this test done at least two times a year (per ADA standard). Perhaps it is more pertinent for the patient to know what their Hemoglobin A1c level is and what that level means about their diabetes care and treatment than what exactly the test is measuring?

44

Questions 7 and 8 could be considered critical questions because knowing what to eat directly affects the blood sugar. While it is important to know why to test blood sugar, diabetics do not necessarily need to fully understand why they are doing it as much as why and when they should eat certain foods.

Diabetes education should include instruction on sick day management training. Patients are taught that their diabetes management should change when they are sick because of the rise in blood sugar that can accompany infection. When the treatment groups are looked at individually, the number of participants that answered question 10 correctly was: 68% of type 2 diabetics, 44% of non diabetics and 50% of the borderlines.

The DKT questions could be divided into the following 2 groups: 1) questions relating strictly to carbohydrate consumption, and 2) questions referring to general diabetes knowledge. The carbohydrate-related questions are probably most relevant to this sample. The questions related strictly to carbohydrate consumption are: 2, 4, 7, and 8. The percentage answered correctly for each of these questions by group is depicted in Table 6.

Table 6

Selected DKT questions with correct answer frequency by group

Question	type 2 dm	no dm	borderline	pre diabetic
2	64%	69%	67%	100%
4	45%	44%	33%	0
7	86%	69%	83%	100%
8	77%	50%	33%	0%

For the truck driving population, educators may need to focus on just the questions that relate to carbohydrate consumption, since that consumption will have the most direct impact on glycemic control. This is not to say that carbohydrate consumption is the only factor in glycemic control. Glycemic control is also a function of the diabetic patient being able to take their medicine correctly and to exercise as allowed and tolerated. Looking at the responses to each question in group 1 (Table 3), educators may receive some insight into how to proceed with their classes or individual sessions. The responses to these questions could be a starting point for a health educator to probe deeper into the specific knowledge of the sample or to plan educational programming that focuses more on topics of these questions. For example, the topic of question 4 is "free foods". A free food (in this context) is any food that has less than 20 calories per serving.

Since time has been identified as an issue with this sample of truck drivers, the educator might want to bring samples of free foods and a typed list of free foods and serving sizes.

At the Doctor's Office, Other Doctor's Visits, My Diabetes Plan

These surveys can help educators and physicians determine how they proceed in their practices. For example, if these health professionals are confident they are meeting the ADA standards, they may want to evaluate whether they are doing an adequate job of describing to the patient what they are doing, so the patient understands what is involved in their diabetic treatment. When the physician is conducting the physical exam, it is important to give the patient feedback. For example, if the physician is conducting a foot exam, this is a good time to tell the patient what they are looking for so that the patient can look for these things when examining their own feet at home. A typical foot exam would include looking between the toes for cracked skin, evaluating dry areas and feeling for pulses in each foot. If the physician is not talking through each of these steps with the patient, the patient may not know what constitutes a foot exam. The patient may think the doctor is just looking at the feet, but not examining them so thoroughly. If educators and physicians are not meeting every standard, they can evaluate their practice to determine where deficiencies are occurring. Out of the 62 questions, only 68% had a "yes" response greater than 60%. Clearly, there is room for improvement and current diabetes statistics indicate the need for improvement in diabetic care.

A recent study published in *Clinical Diabetes* illustrates this point. At the beginning of the study, few of the 220 primary care physicians (PCP) at the University of Pittsburgh's Medical Center (UPMC) were implementing the ADA standard of care.

Researchers set out to see if these PCPs would be able to adopt practice methods that would integrate the ADA standard of care into their current practice model. At the end of the study, 15,867 patients' lab results revealed decreases in Hemoglobin A1c levels to 6.97%. The national average Hemoglobin A1c is 7.8% and the recommended value for type 2 diabetics is below 6%. This study also produced reductions in blood pressure readings and lipid levels ("Intensive diabetes management...", 2004)

Use of the interdisciplinary healthcare team may be the best way to insure the utilization of the ADA standard of care. For example, the American Society of Health-Care Pharmacists advises their members to play an important role in their patient's diabetes care by checking that the patient's physician is adhering to the ADA standard of care (Campbell, 2002). However, going back to a question that this research raised, if the patient does not know what the physician is doing, then the patient cannot say if their physician is meeting the ADA standard of care or not. While it would be a good idea for patients to know about the ADA standard of care, patients cannot be expected to do the physician's job for them. In looking at the DKT scores, it is clear that patients already have difficulty remembering everything they are taught about diabetes. These results may indicate it is time to focus patient education efforts more on knowledge that relates most directly to blood glucose levels (carbohydrate consumption and medication) and on physician education, the latter as demonstrated by UPMC.

Review of specific questions

The following is a discussion of specific questions (those with a yes response below 60%) in each survey and their potential impact on diabetes management among truck drivers with type 2 diabetes.

ADO

5	I was referred to an eye physician for a dilated eye exam	Yes	7	53.8%
		No	6	46.2%
		Don't remember	0	0%

Truck drivers are required to have 20/40 vision on the Snellen scale, although corrective lenses are allowed, and they must also have a field of vision of 70 degrees (49 CFR 391.41(b)(10)). Diabetes is one of the leading causes of blindness in the United States (American Diabetes Association, 2004). A dilated eye exam enables an ophthalmologist to see if there has been damage to the tiny blood vessels of the eye. This damage can be halted with laser surgery. Diabetics with this type of eye damage are often advised not to lift heavy objects or to do physical activity that requires straining. Since some truck drivers must also unload their trucks, it would be advantageous for these drivers to know if they had this type of damage so they could change their work conditions, to the extent possible. Another reason this discussion is important is that patients may not know the difference between ophthalmologists and optometrists. While both are called "doctor," only the ophthalmologist is a medical physician (M.D.), and only the ophthalmologist can do the dilated eye exam and laser surgery.

7	Someone asked about my dental care	Yes	7	53.8%
		No	5	38.5%
		Don't remember	1	7.7%

Diabetics have a higher risk for dental caries. If the primary physician asks about dental care, then possibly, truck drivers will view dental care as important in their diabetes management.

12	Someone checked my other organs	Yes	6	46.2%
		No	4	30.8%
		Don't remember	3	23.1%

In reference to this question, it is possible the participants did not know what the physician was doing. This is just another indication of the need for physicians to explain what procedures they are doing and why they are doing them. If physicians do not communicate during the procedure, patients may not appreciate the actual procedure nor understand its need. If the patient understands that the physician is providing a valuable service, they may be more likely to keep their regular appointments.

22	Someone asked for lab results for tests I had in the past	Yes	4	30.8%
		No	7	53.8%
		Don't remember	2	15.4%

In reference to the results for this question, it is possible the patients had the same physicians for a very long time, and thus, the physicians would already have previous lab results.

25	Someone asked about my current diabetes treatment plan	Yes	7	53.8%
		No	5	38.5%
		Don't remember	1	7.7%

Health educators are taught to never assume anything, but instead, to always ask. Even though these questions (ADO) refer to the patient's first visit after diagnosis, this question is still pertinent. This particular question gives the physician a chance to address misinformation the patient may be putting into practice. A patient with a diabetes diagnosis might be motivated to seek out information from friends, family and/or the internet. While friends and family can be a great source of support, their information may not be up to date if they have not received recent diabetes education. Drivers who listen to their friends may end up eating the wrong diet or taking their medications incorrectly, both of which can lead to poor diabetes management and potential complications.

27	Someone asked if I've had low blood sugars	Yes	4	30.8%
		No	7	53.8%
		Don't remember	2	15.4%

This result is particularly disturbing since the main reason behind the driving restrictions is the risk of low blood sugars. Unfortunately, it appears this is another lost opportunity to provide important and timely education. If drivers do not understand the meaning of low blood sugar or how to determine if they have low blood sugar, the educator can explain and instruct themon how to use a blood glucose monitor.

28	Someone asked about infections I've had	Yes	7	53.8%
		No	4	30.8%
		Don't remember	2	15.4%

Infection can raise a person's blood sugar. A high blood sugar level (greater than 200) can result in loss of consciousness. Diabetes management during an infection must be altered to avoid complications. Ultimately, drivers need to be taught to recognize the situations that might warrant a change in their diabetes management.

29	Someone asked about complications I've had and what treatments I've received for them	Yes	7	53.8%
		No	5	38.5%
		Don't remember	1	7.7%

It is possible that in asking the other questions, such as looking at the patient's feet and in the patient's eyes, the health care provider did talk about complications and/ or was able to determine the complications the patient had or was suffering from. If not, this question is another reminder of what the health care provider should cover in this first visit.

ODV

1	Someone asked about how often I've had high or low blood sugars	Yes	7	58.3%
		No	5	47.7%
		Don't remember	0	0%
2	Someone asked to see my blood sugar records	Yes	7	58.3%
		No	5	41.7%
		Don't remember	0	0%

In reviewing these first two questions, it is important to note that at least one of the above actions should take place, with the second option being the preferred one. Ideally, a member of the health care team should make a copy of the blood sugar records so that it can become part of the medical record. When the health care team documents the blood sugar records, this indicates to the patient that this part of their diabetes care is important. Secondly, if the health care team does not review the blood sugar log, how would they determine the effectiveness of the medications? By reviewing the log, the health care provider would be able to determine more specific probing questions for the patient. For example, if the blood sugar record has a reading of 150 mg/dl after dinner, the educator can inquire as to what the person ate for that meal or check that the patient is taking their medicine properly. Whatever the case may be, the blood sugar record is often not only the first clue but also the map of where to go with a particular patient.

3	Someone asked what changes I've made to my diabetes care plan	Yes	5	47.7%
		No	6	50%
		Don't remember	1	8.3%

Another important question is to ask if the patient has made any changes since the last visit. These changes could be positive or negative. For example, a patient who was sedentary may now be walking 30 minutes a day. This activity might be enough to warrant an alteration to the medication. An unfortunate but all too common change is for patients to skip a dose of their medication due to financial reasons. If this is occurring, the health care provider needs to know in order to help their patients get the necessary medication. This process could involve contacting social work to inquire about programs that provide medication. The physician might also think about changing the patient to a less expensive medication.

4	Someone asked what problems I've had following my diabetes care plan	Yes	6	50%
		No	5	41.7%
		Don't remember	1	8.3%

Asking patients if they have had problems following their diabetes care plan could be another way of assessing if they understand or remember their diabetes care plan. If the patients cannot explain their plan or what steps they have been taking to follow their plan, this should serve as a sign to the health care providers thatthe patient may need more instruction concerning their diabetes care.

5	Someone asked about symptoms that might mean I am getting diabetes complications	Yes	6	50%
		No	6	50%
		Don't remember	0	0%

Since this survey refers to any physician's visit after the initial diagnosis, it is possible this question might not apply to every visit. For example, the participant may have already developed diabetes complications and, thus, the physician may have just conducted a physical examination rather than ask the patient. Likewise, thephysician's physical examination may have uncovered any complications without the physician having to ask the patient about the development of complications. If this survey were administered in an interview style and was designed to allow for qualitative data-collection, this would be a point where the researcher could ask additional questions as to what the participant remembers of past physician communications concerning diabetic complications.

8	Someone asked if my life changed in any way	Yes	6	50%
		No	6	50%
		Don't remember	0	0%

Being that many life changes can affect blood sugar levels, it is important for the physician to ask the patient about life changes at every visit. A change in the patient's schedule, eating habits, activity level, or general health can all cause blood sugar levels to rise. Even when a patient may appear to effectively handle change, there is still a release of stress hormones associated with life changes that will raise blood sugar levels (Franz, 2001). Asking this type of question provides the physician with a better understanding of

the reason for alterations in blood sugar levels and may offer a solution as to the best treatment option for each patient.

12	Someone looked at my feet	Yes	6	50%
		No	6	50%
		Don't remember	0	0%

Irreversible foot damage, which can lead to amputation, can occur over a short period of time. Therefore, even though patients should be taught to examine their feet daily, the physician should not rely on the patient to be conducting their daily foot exam.

14	Someone reviewed my treatment plan to measure my progress	Yes	6	50%
		No	6	50%
		Don't remember	0	0%

Reviewing the treatment plan reinforces the plan to the patient and provides much needed positive reinforcement by detailing their accomplishments since their last visit. The review may also highlight areas of the plan that need more attention from the patient and the health care team. This time may also be used to help the patients to feel empowered and an actual part of the decision making process rather than just a spectator on the sidelines of their diabetes management.

MDP

The nature of the diabetes plan is to only include those items the patients believe they can actually accomplish in a given time frame. It is possible that other options were discussed, but the unique situations for each participant may have prevented them from including some of the recommended actions in their own diabetes plans. Additional

qualitative information could have been collected during the study to explain such situations, but even without such information, the results of the study provide meaningful insight into various diabetes plans used among truck drivers.

6	My plan includes classes for me and my family on taking care of my diabetes	Yes	2	22.2%
		No	7	77.8%
		Don't remember	0	0%

Some insurance companies and Medicare will only pay for diabetes education in a classroom setting unless the patient has a special circumstance. Research has demonstrated that the classroom setting is preferable for diabetes education. It was recently reported in *Diabetes Educator* that Hispanic patients reported a greater sense of self-efficacy, especially in the areas of diet, after attending diabetes education classes (Bernal, Woolley, Schensul, & Dickinson, 2000). Other researchers have found that participants in a group setting lowered their Hemoglobin A1cs below the amount of participants who completed individual sessions (Rickheim, Weaver, Flader & Kendall, 2002).

8	My plan includes seeing a foot doctor	Yes	1	11.1%
		No	8	88.9%
		Don't remember	0	0%

This result would be less disturbing if the response to question 12, on foot exams, in the ODV instrument had a greater than 50% 'yes' response. If the primary physician is not going to be examining the patient's feet at each visit, then it seems like a good practice to include seeing a podiatrist as part of the patient's diabetes care plan.

According to the ADA, more than 60% of non-traumatic limb amputations in the United States are a result of diabetes (National Diabetes Fact Sheet, 2003). Once a patient has an amputation, not only does their quality of life decrease, but they are also at much greater risk for an additional amputation (Peters et al., 2001).

11	My plan includes seeing a dentist	Yes	4	44.4%
		No	4	44.4%
		Don't remember	1	11.1%

Diabetics are twice as likely to have gum disease leading to tooth loss than non-diabetics (National Diabetes Fact Sheet, 2003). Unfortunately, a recent CDC study found that 73.1% of non-diabetics and 65.8% of the diabetic respondents saw the dentist in the past 12 months (Tomar & Lester, 2000). These statistics support the need for structured programs, such as at UPMC, that has provisions in place for teaching physicians how to implement the ADA standard of care for type 2 diabetes.

12	My plan includes information on what to do when I am sick	Yes	2	22.2%
		No	7	77.8%
		Don't remember	0	0%

Only 53% of participants knew that an infection raises blood sugar levels. That result, coupled with this finding, could ultimately lead to dangerous side effects. High blood sugar levels can cause the patient to enter into a diabetic coma, which is also known as diabetic ketoacidosis (DKA). DKA is a potentially life-threatening situation requiring immediate insulin therapy to bring the blood sugar level down quickly to a safer

level. Sick day management is considered by some diabetes educators to be so important that it is called a "survival skill" and is taught to the patient before leaving the hospital.

TFS

The purpose of this survey was to determine participants' perceived barriers in receiving health care for their diabetes and to determine the level of internet usage in the sample. Some questions were based on the researcher's assumptions about the sample. These assumptions were formed, in part, via interactions over the previous two years between the researcher and truck drivers in online discussion boards.

The first two questions were based on the researcher's assumption that time was a barrier to participants receiving proper health care. The questions asked about their most recent physician's visit and the number of times the participant visited the physician for their diabetes care during one year. Over half of the participants had visited their physicians in the past month. These patients may have been searching the internet for diabetes information stemming from this most recent physician's visit and found the study instruments. Only 58% of respondents visited their physician three to four times (or more) a year, which the ADA recommends. Five respondents reported only visiting their physician twice per year. A follow-up question would help in determining whether those participants only went twice because of a physician's recommendation or instead because the patient could not find time to schedule another visit during the year.

Question 3 asked the participants if they thought they were at risk for diabetes prior to their diagnosis. Over half of the participants (66.7%) responded 'yes' to that question. Conceptually, a health educator could take this information and develop an

59

educational program based on the Health Belief Model (HBM) (Janz, Champion and Strecher, 2002). The constructs of the HBM are: Perceived Susceptibility, Perceived Severity, Perceived Benefits, Perceived Barriers, Cues to Action, and Self-Efficacy. In this study, a majority of the participants responded as having a Perceived Susceptibility to diabetes. Perceived Severity could refer to the complications of diabetes, as well as to the loss of the CDL if the participant has to use insulin. Additional resources could be performed to evaluate the degree to which these participants felt they were at risk for diabetes complications.

Perceived Benefits could range from subjective measures (feeling better) to objective measures such as saving money from not having to take as much medication. The educator should construct a perceived benefits list from responses to qualitative studies, such as TSF. The list of Perceived Benefits should be as extensive as possible so as to convince the participant that the cost of action (in time, effort and sacrifice) is worthwhile. Some Perceived Barriers, such as time management issues and cost, have been identified from this study; however, they may not be applicable to other truck drivers.

Determining Cues to Action would require additional study of the target population. For example, since this sample was recruited over the internet, perhaps they would be motivated by email reminders to check their blood sugar or to examine their feet. Some health related websites, such as webmd.com, have personal journals online where participants can track health data. This health data can then be viewed as a chart. An email reminder to enter information and then the graph that visually shows the

participant's progress might help participants maintain their diabetes plan. The degree to which this type of action may help is another area for future research. Such proposals must always keep in view that self-efficacy cannot be given to the participant; he must develop it over time by setting and achieving goals. This research does not definitively say that the internet is the best way to reach this population and for developing self-effective health programs, but it is a new method that should be investigated further and refined to reach those who can benefit from this method.

Approximately 60% of respondents stated they look to the internet for information on diabetes and diabetic treatments. Only 12% of respondents reported seeking diabetes information from their physicians or dietitians. This statistic highlights the importance of the internet and the need for health care providers to ask patients questions concerning their diabetes care. The health care provider must assume nothing. If the patient's blood sugar levels are not what they should be, the health care provider must play the role of sleuth to determine how the daily diabetic care is implemented and what changes should be made in the future.

Internet Research

Using the internet for recruitment and data collection was not a simple process. The first hurdle was the potential risk to participant privacy in internet research, which was scrutinized in some detail during the Institutional Review Board (IRB) application for this project. Using the internet for research is relatively new for Texas Woman's University. Since this study had the possibility of gathering potentially sensitive medical information, the IRB and the researcher wanted to be particularly careful as to how

participants would answer surveys and how the responses would be collected and stored. For that reason, the researcher did not gather any identifying information on the participants, other than their diabetes status.

Additionally, collecting the sample took longer than anticipated. Epstein and Klinkenberg designed an internet based survey for homosexuals (2002). They used over 10 different methods for recruitment, including: radio public service announcements, banner ads, magazine ads and newsgroup message postings. Of all the attempted methods, the best recruitment tool was the banner ad. Banner ads can be very expensive and, therefore, were not feasible for this particular study. Nevertheless, the researcher assumed that the sample would be collected in as little time as two weeks, given the assumed amount of activity on the trucknet.com discussion board. However, it took over 13 weeks to collect enough data. Unfortunately, this study design was not constructed to evaluate the effectiveness of the process. Some possible reasons for slow recruitment could be that potential participants were reluctant to click on an unknown website or perhaps they did not have high speed connections, and thus, filling out the surveys took too long. It is also possible that the instruments were not what potential participants thought they would be, and so those potential participants did not start or complete them.

The host website for the instruments, addaform.com, caused at least one problem in data collection. Addaform.com kept a tally of how many participants completed each instrument and the frequencies of each answer for each question. The researcher was also emailed the raw data for each completed survey. In comparing the email tallies with what addaform.com was reporting, a discrepancy was found. Addaform.com had the

total number of type 2 diabetics as 23 and the non diabetics at 15. In reality, there were 22 type 2 diabetics and 16 non diabetics. The researcher then had to go through each question and correct the answer frequencies. Therefore, what could have been a very simple step for reporting the frequencies instead became a more labor- and time-consuming part of this study. If there were other such discrepancies, they were not noticed, but nonetheless might have occurred.

Recommendations

Overall, this research was an important starting point for understanding truck drivers' level of diabetes knowledge and in determining some of the barriers to providing the healthcare necessary to improve their diabetes knowledge. This study has also uncovered areas for future research. Specifically, the following ideas should be investigated:

1. How does the DKT score correspond to glycemic control in the truck driving population?

2. Could a term other than "free food" be used that would result in less confusion in the target population and others with diabetes?

3. What is the best method for educating people who think they are "borderline" diabetic?

4. What are the best methods for encouraging physicians and other health care team members to consistently implement the ADA standard of care?

5. Would diabetic truck drivers utilize a website designed for their unique needs as frequently as they use the internet for researching diabetes?

6. How much time is the truck driving population willing to spend on diabetes education?

7. How much time does it take to implement various diabetes education modules?

Even though this research is not necessarily applicable to the truck driving population as a whole, it still contains valuable information for health educators. Time and cost were determined to be the biggest factors regarding health care for this sample. One approach health educators could initiate would be to evaluate educational materials on the basis of how much time they take to implement. Drug companies, the ADA and other entities create and provide many educational materials free of charge. These materials come in many formats, from e-newsletters and CD-ROMs to printed materials and classroom curriculum. Rather than continuing to "re-invent the wheel", it would seem prudent to take these educational materials and see how best they could fit for the target population. In doing so, the health educator should take into account the DKT results. These results are an effective starting point for educational efforts because they highlight the areas that need further clarification; and based on similar results from Murata et al., it is not just this population that needs clarification, but others as well. Based on the ADO and ODV, the educator would also want to offematerial s on sick day management and the need to have regular appointments with a dentist and a podiatrist.

These starting points could be the basis for developing pilot programs for truck drivers. The pilot program is important to determine the best methods of delivery for this target population. The delivery methods may vary by topic and even by location. The point is that the most effective means for transferring diabetes information to this

population is yet to be determined. This current study has helped to determine knowledge deficits in certain categories, further research must explore how best to impart that knowledge.

REFERENCES

Advocates for Highway and Auto Safety v. Fed. Hwy. Admin., 28 F. 3d 1288 (D.C. Cir. 1994)

American Diabetes Association. (2004). Diabetes and Retinopathy (Eye Complications). Retrieved May 21, 2004 from http://www.diabetes.org/diabetes-statistics/eye-complications.jsp

American Diabetes Association. (2004). Diabetes Statistics for African Americans. Retrieved May 21, 2004 from http://www.diabetes.org/diabetes-statistics/african-americans.jsp

American Diabetes Association (2003). National Diabetes Fact Sheet. Retrieved June 19, 2004 from http://www.diabetes.org/diabetes-statistics/national-diabetes-fact-sheet.jsp

Baker, L.B., Wagner, T.H., Singer, S., and Bundorf, M.K. (2003). Use of the Internet and E-mail for Health Care Information. *Journal of the American Medical Association, 289, 2400-2406.*

Barak, A. and English, N. (2002). Prospects and Limitations of Psychological Testing on the Internet. *Journal of Technology in Human Services. 19, 65-89.*

Bernal, H., Woolley, S., Schensul, J.J., and Dickinson, J.K. (2000). Correlates of self-efficacy in diabetes self-care among Hispanic adults with diabetes. *Diabetes Educator. 26 (4), 673-680.*

Brown, S.A., Garcia, A.A., Kouzekanani, K., and Hanis, C.L. (2002). Culturally Competent Diabetes Self-Management Education for Mexican Americans. *Diabetes Care. 25(2) 259-268.*

Campbell, R.K. (2002). Role of Pharmacists in Diabetes Management. *American Journal of Health-Systems Pharmacists. 59S, 18-21.*

Centers for Disease Control and Prevention. (2002). Diabetes: A serious public health problem. Retrieved September 12, 2002 from http://www.cdc.gov/needphp/bb_diabetes/index.htm.

Centers for Disease Control and Prevention. (2004). Frequently Asked Questions. Retrieved May 24, 2004 from http://www.cdc.gov/diabetes/faqs.htm#types

Centers for Disease Control and Prevention. (2002). National Diabetes Fact Sheet. Retrieved September 14, 2002 from http://www.cdc.gov/diabetes/pubs/estimates.htm#prev3.

Centers for Disease Control and Prevention. (2002). Preventing worker injuries from traffic-related motor vehicle crashes. Retrieved September 20, 2002 from http://www.cdc.gov/niosh/motralrt.html

Centers for Disease Control and Prevention. (2002). Strategies for reducing morbidity and mortality diabetes through health-care system intervention diabetes self-management education in community setting. Retrieved September 18, 2002 from http://www.cdc.gov/mmwr/preview/mmwrhtmol/rr5016a1.htm.

Civille, R. (1995). "The Internet and the poor." In B. Kahin and J. Keller (Eds.), *Public access to the Internet* (pp. 175-207). Cambridge, MA: The MIT Press.

Commercial Driver's License Program. (2002). Retrieved October 21, 2003 from http://www.fmcsa.dot.gov/safetyprogs/cdl.htm

Cox, D.J., Penberthy, J.K., Zrebiec, J., Weinger, K., Aikens, J.E., Frier, B., et al. (2003). Diabetes and Driving Mishaps. *Diabetes Care. 26(8), 2329-2335.*

Edelman, S.V. and Henry, R.R. (2002). *Diagnosis and Management of Type 2 Diabetes* (5th ed.). Caddo, OK: Professional Communications, Inc.

Epstein, J. and Klinkenberg, W.D. (2002). Collecting Data via the Internet: The Development and Deployment of a Web-based Survey. *Journal of Technology in human services. 19(2/3), 33-47.*

Federal Highway Administration, Department of Transportation, 49 CFR Part 391, (November 25, 1987)

Federal Motor Carrier Safety Administration, 63 Fed. Reg. 395.1 (June 18, 1998)

Federal Motor Carrier Safety Administration. (2000). A Report to Congress on the Feasibility of a Program to Qualify Individuals with Insulin Treated Diabetes Mellitus to Operate Commercial Motor Vehicles in Interstate Commerce as Directed by the Transportation Equity Act for the 21st Century.

Federal Motor Carrier Safety Administration. (2001). Qualifying Individuals with Insulin-Treated Diabetes to Operate Commercial Motor Vehicles. Retrieved May 8, 2004 from http://www.fmcsa.dot.gov/safetyprogs/research/briefs/TB%2002-01_1.htm

Fitzgerald, J.T., Anderson, R.M., Funnell, M.M., Hiss, R.G., Hess, G.E., Davis, W.K., Barr, P.A. (1998). "The Reliability and Validity of a Brief Diabetes Knowledge Test" *Diabetes Care, 21(5): 706–710*

Franz, M.J. (Ed.). (2001). A Core Curriculum for Diabetes Education: Diabetes and Complications. (4th ed.). Chicago: American Association of Diabetes Educators.

Gonzalez, J.E. (2002). Present Day Use of the Internet for Survey-Based Research. *Journal of Technology in Human Services. 19, 10-31.*

Hannerz, H. and Tuchsen, F. (2001). Hospital admissions among male drivers in Denmark. *Occupational and Environmental Medicine, 58, 253.* Retrieved November 26, 2002, from http://www.twu.edu

Intensive diabetes management yields positive results. (2004, April 26). *Managed Care Weekly Digest, p.31.*

International Diabetes Federation. (2003). *Did you know?* Retrieved June 22, 2004, from http://www.idf.org/home/index.cfm?node=37

Internet Glossary. (2003). Retrieved October 21, 2003 from http://biznetzone.net/support/gloss.asp

Janz, N.K., Champion, V.L., and Strecher, V.J. (2002). **The Health Belief Model.** In Glanz, K, Rimer, B.K., and Lewis, F.M. (Eds.), *Health Behavior and Health Education* (pp. 45 – 66). San Francisco: Jossey-Bass.

Joslin Diabetes Center. (2004). An Overview of Diabetes. Retrieved May 24, 2004, from http://www.joslin.harvard.edu/education/library/wfewfact.shtml

Judging a Healthy Weight: Is their truth in numbers? (2003). Retrieved October 21, 2003, from http://www.eatright.org/Public/NutritionInformation/index_17169.cfm

Keers, J.C., Blaauwwiekel, E.E., Hania, M., Bouma, J., Scholten-Jaegers, S.M.H.J., Sanderman, R. and Links, T.P. (2004). Diabetes rehabilitation: development and first results of a Multidisciplinary Intensive Education Program for patients with prolonged self-management difficulties. *Patient Education and Counseling. 52(2). 151-158.*

Laberge-Nadaue, C., Dionne, G., Ekoe, J. (2002). Impact of diabetes on crash risks of truck-permit holders and commercial drivers. *Diabetes Care, 23(5), 612.*

LaPorte, R. E. (1991) Insulin-using commercial motor vehicle drivers. (1991). Retrieved September 10, 2002 from http://server1.circl.pitt.edu/home/docs/diabetes%20cmv%20drivers.pdf.

Merriam-Webster Online Dictionary. (2003). Retrieved October 21, 2003 from http://www.merriam.com

Michigan Diabetes Research and Training Center. (2003). MDRTC Hemoglobin A1C Fact Sheet. Retrieved June 17, 2004, from http://www.med.umich.edu/mdrtc/cores/ChemCore/hemoa1c.htm

Murata, G.H., Shah, J.H., Adam, K.D., Wendel, C.S., Bokhari, S.U., Solvas, P.A., Hoffman, R.M., and Duckworth, W.C. (2003). Factors affecting diabetes knowledge in Type 2 diabetic veterans. *Diabetologia, 46, 1170-1178.*

National Diabetes Information Clearinghouse. (2001). *Diabetes Control and Complications Trial (DCCT).* Retrieved June 22, 2004, from http://diabetes.niddk.nih.gov/dm/pubs/control/index.htm

Peters, E.J.G., Childs, M.R., Wunderlich, R.P., Harkless, L.B., Armstrong, D.G. and Lavery, L.A. (2001). Functional Status of Persons With Diabetes-Related Lower-Extremity Amputations. *Diabetes Care. 24, 1799 – 1804.*

Pittenger, D.J. (2003). Internet Research: An Opportunity to Revisit Classic Ethical Problems in Behavioral Research. *Ethics and Behavior, 13(1), 45-60.*

Pommerenke, F; Hegmann, K; Hartenbaum, N.P. (1998). DOT examinations: practical aspects and regulatory review. *American Family Physician. 58(2), 415-426.*

Rickheim, P.L., Weaver, T.W., Flader, J.L., and Kendall, D.M. (2002). Assessment of Group Versus Individual Diabetes Education. *Diabetes Care. 25, 269-274.*

Roberts, S. (1997). *Design, Development, and Evaluation of Driver Wellness Programs. Technical Memorandum Number One: Wellness Literature and Programs Review.* Des Moines, IA: Sue Roberts Health Concepts.

Roberts, S and York, J. (1997). *Design, Development and Evaluation of Driver Wellness Programs. Technical Memorandum Number One: Wellness Literature and Programs Review.* Des Moines, IA.

Seshagiri, B. (1998). Occupational noise exposure of operators of heavy trucks. *American Industrial Hygiene Association Journal, 3, 205-213.*

Stoohs, R.A., Bingham, L., Itoi, A., Guilleminault, C., and Dement, W.C. (1995). Sleep and sleep-disordered breathing in commercial long-haul truck drivers. *Chest, 107, 1275-1283.*

Top 10 Occupations, by Race/Ethnicity and Gender. (1998). Retrieved October 7, 2002, from http://orion.oac.uci.edu/~cohenp/occs98.pdf.

Truckdrivers and drivers/sales workers. (2002). Retrieved November 26, 2002 from http://www.bls.gov/oco/ocos246.htm

U.S. Department of Labor – Bureau of Labor Statistics. (2002). *Truckdrivers and drivers/sales workers.* Retrieved November 26, 2002 from http://www.bls.gov/oco/ocos246.htm

U.S. Department of Labor – Bureau of Labor Statistics. (2001). *Current Population Survey.* Retrieved December 9, 2003 from http://http://www.bls.census.gov/cps/

Weight Management. (2003). Retrieved October 21, 2003, from http://www.eatright.org/Public/NutritionInformation/92_11824.cfm

West, J.D. and Goldberg, K.L. (2002). Diabetes self-care knowledge among outpatients at a Veterans Affairs medical center. *American Journal of Health Systems Pharmacy, 59,849-852.*

What is type 2 diabetes? (2003). Retrieved October 21, 2003 from http://www.diabetes.org/type2/info/default.jsp

Why choose trucknet.com? (2003). Retrieved October 21, 2003, from http://www.truck.net/about

APPENDIX A

Content of discussion board study recruitment message

My name is Michelle Prejean, otherwise known as texasrd on this message board. I am conducting an online survey about diabetes and truck drivers for my dissertation research as a student at Texas Woman's University. The title of this research project is Assessing diabetes knowledge, perceived standard of care, and perceived barriers to health care among truck drivers with type 2 diabetes mellitus. I am seeking 30 truck drivers who have a CDL license to participate in this research. Participation is strictly voluntary. The first part of the survey (link 1) is a multiple-choice questionnaire about general diabetes knowledge. This part contains only 14 questions and can be answered by people with or without diabetes. The second part of the questionnaire (links 2-5) asks questions about the health care you receive when you go to the doctor for your diabetes. In the second part of the survey, you will have the opportunity to write as much or as little as you would like to on this subject. You never have to reveal your name or any information that will identify who you are. I have no way of knowing who you are unless you send me a personal email or message through this discussion board. If you do contact me via these methods, I will know your email address, but will have no way of connecting your email address to your survey responses. The researcher will not discuss individual participants with anybody nor will the researcher contact your employer or even know who your employer is or how to

contact them regarding your participation in this study. These web links bring you to an

independent website that will collect your answers and forward them to me at another time.

Your answers to these surveys will be deleted from the add-a-form website and from the

researcher's personal computer at the completion of the study, but no earlier than

December, 2004.

Link 1 - Diabetes Knowledge Test - 14 multiple choice questions regarding your diabetes
knowledge. (most important - if you answer no other survey - please answer this one - and
it doesn't matter if you have Diabetes or not:
http://www.addaform.com/c/@N00oqAh7_ATuQ/Forms/5117AiDZ/5117AiDZ.html

Link 2 - The Final Say - write as little or as much as you like about your diabetes
healthcare. 10 questions total.
http://www.addaform.com/c/@N00oqAh7_ATuQ/Forms/5122Dy8_/5122Dy8_.html

Link 3 - At the Doctor's Office - 36 yes/no questions regarding your diabetes healthcare at
your first doctor's visit after being diagnosed with diabetes.
http://www.addaform.com/c/@N00oqAh7_ATuQ/Forms/511865Pv/511865Pv.html

Link 4 - My Diabetes Plan - 12 yes/no questions regarding your diabetes plan that was
developed by you and your diabetes care team.
http://www.addaform.com/c/@N00oqAh7_ATuQ/Forms/5120VuoN/5120VuoN.html

Link 5 - Other Doctor's Visits - 14 yes/no questions regarding any other visits you have had
to your doctor after the first visit and concerning your diabetes.
http://www.addaform.com/c/@N00oqAh7_ATuQ/Forms/5121JnbT/5121JnbT.html

The results of this study will be posted in this discussion board at the completion of the

study. Your participation is greatly appreciated!

Thank you –
Michelle Prejean

APPENDIX B

DKT test reliabilities

Component[*]	Community		MDPH		Total	
	Percent correct	Item-total correlation	Percent correct	Item-total correlation	Percent correct	Item-total correlation
General test (items 1D4)						
n	312		499		811	
1	87	0.19	82	0.23	84	0.22
2	42	0.38	46	0.32	45	0.34
3	36	0.16	29	0.26	32	0.23
4	61	0.29	53	0.38	56	0.35
5	29	0.27	28	0.18	29	0.22
6	79	0.25	72	0.28	74	0.27
7	59	0.36	51	0.35	54	0.36
8	54	0.42	52	0.38	53	0.39
9	90	0.28	81	0.30	85	0.30
10	78	0.28	80	0.29	79	0.28
11	88	0.40	88	0.33	88	0.35
12	88	0.30	84	0.40	85	0.37
13	81	0.41	75	0.43	77	0.43
14	93	0.38	90	0.37	91	0.37

APPENDIX C

The Diabetes Knowledge Test by the Michigan Diabetes Research and Training Center

Michigan Diabetes Research and Training Center

The return of your completed questionnaire constitutes your informed consent to act as a participant in this research.

1. The diabetes diet is:
    a. the way most American people eat
    b. a healthy diet for most people *
    c. too high in carbohydrate for most people
    d. too high in protein for most people

2. Which of the following is highest in carbohydrate?
    a. Baked chicken
    b. Swiss cheese
    c. Baked potato *
    d. Peanut butter

3. Which of the following is highest in fat?
    a. Low fat milk *
    b. Orange juice
    c. Corn
    d. Honey

4. Which of the following is a "free food"?
    a. Any unsweetened food
    b. Any dietetic food
    c. Any food that says "sugar free" on the label
    d. Any food that has less than 20 calories per serving *

5. Glycosylated hemoglobin (hemoglobin A1) is a test that is a measure of your average blood glucose level for the past:
    a. day
    b. week
    c. 6-10 weeks *
    d. 6 months

6. Which is the best method for testing blood glucose?
    a. Urine testing
    b. Blood testing *
    c. Both are equally good

77

7. What effect does unsweetened fruit juice have on blood glucose?
    a. Lowers it
    b. Raises it *
    c. Has no effect

8. Which should not be used to treat low blood glucose?
    a. 3 hard candies
    b. 1/2 cup orange juice
    c. 1 cup diet soft drink *
    d. 1 cup skim milk

9. For a person in good control, what effect does exercise have on blood glucose?
    a. Lowers it *
    b. Raises it
    c. Has no effect

10. Infection is likely to cause:
    a. an increase in blood glucose *
    b. a decrease in blood glucose
    c. no change in blood glucose

11. The best way to take care of your feet is to:
    a. look at and wash them each day *
    b. massage them with alcohol each day
    c. soak them for one hour each day
    d. buy shoes a size larger than usual

12. Eating foods lower in fat decreases your risk for:
    a. nerve disease
    b. kidney disease
    c. heart disease *
    d. eye disease

13. Numbness and tingling may be symptoms of:
    a. kidney disease
    b. nerve disease *
    c. eye disease
    d. liver disease

14. Which of the following is usually not associated with diabetes:
    a. vision problems
    b. kidney problems
    c. nerve problems
    d. lung problems *

Note: Correct answers are designated with *

APPENDIX D

Permission to use DKT, originally completed, January 31, 2003.

MDRTC Request for Survey Instruments

As a service to us, please fill out the following information. We would appreciate it if you would complete the entire form. The items that are required to be completed in order to download survey instruments are profession, affiliation, city, state or country, and your email address. Your email address will not be given to others. If you do not have an email address or do not want to include your email address, please enter anonymous@umich.edu in the email box below.

* Required

Name: [   ]

Profession: [   ] *

Affiliation: [   ] *

Address: [   ]

City: [   ] *

State (or Country if not US): [   ] *

Telephone: [   ]

Email: [   ] *

Fax: [   ]

Requestor information:
☐ Student   ☐ Health Profession   ☐ Other

Are you planning to use these surveys?   ☐ Yes   ☐ No   ☐ Not Sure

80

If yes, how are you going to use these materials?

☐ Research Project

☐ Clinical Outcomes Evaluation

☐ Education Program Evaluation

☐ Master or doctoral project/thesis

Please read the following before submitting this form. By submitting this form, you are agreeing to abide by the statement:

You have our permission to reproduce and use these instruments and materials as long as the Michigan Diabetes Research and Training Center is acknowledged in any instrument, report or publication resulting from their use.

The information in the Survey Instruments is not a tool for self-diagnosis or a substitute for professional care.

[Agree & Submit] [Reset]

81

APPENDIX E

ADA Standard of Care for type 2 diabetes, verbatim from www.diabetes.org

Standards of Care

When you have diabetes, it is important that you get good medical care. Now that it's clear that high blood sugar (glucose) levels play a role in many complications, your doctor's skill is more vital than ever. Good care helps you live a full life with as few complications as possible.

But what is good care? The American Diabetes Association provides standards of medical care for people with diabetes. These guidelines give the most up-to-date information on taking care of your diabetes. Also, the guidelines let you know what to expect from your doctor and health care team.

The Team Approach

You should be receiving your diabetes care from a team put together by your doctor. Diabetes is complicated. Your doctor alone cannot be an expert in every area. For this reason, your diabetes care team may include an eye doctor, nurses, and a dietitian. Depending on what complications you have, your doctor may send you to other specialists as well, such as a foot doctor.

The Goal

Too-high levels of sugar in the blood are a feature of all forms of diabetes. The main goal of diabetes treatment is to bring sugar levels down to as close to normal as is safely possible. How far down? Suggested goals are 80-120 milligrams per deciliter (mg/dl) before meals and 100-140 mg/dl at bedtime. Your doctor may set different targets for you, depending on other factors, such as how often you have low blood sugar reactions. Most aspects of your treatment plan -- measuring your sugar levels, taking diabetes pills or insulin shots, exercising, losing weight, planning meals -- are aimed at helping you reach your target sugar level.

High sugar levels can affect many parts of the body. They can lead to eye, nerve, and kidney diseases. High sugar levels also make it easier to get infections. They can blur your vision or make you feel tired or thirsty all the time. People with diabetes also are more likely to develop other health problems, including high blood pressure, high cholesterol and fat levels, and heart disease.

As you can see, keeping your sugar levels under control is vital to your future health and happiness. Your team can advise you on ways to reach this goal. But much rests on your shoulders. For this reason, your treatment team should spend a lot of time teaching you about diabetes and how to make diabetes care part of your life.

The First Visit

Your first visit to a doctor who will treat your diabetes should have four parts. 1) The doctor should take a medical history (ask questions about your life, complications, and previous diabetes treatment plan). 2) The doctor should give you a complete physical examination. 3) The doctor should run tests on your blood and urine to find out your blood sugar level, your glycated hemoglobin level (a measure of average blood glucose levels over the past 2-3 months), your cholesterol and fat levels, and your urine protein level. Your age, complications, and symptoms dictate which other laboratory tests your doctor does. 4) Your health care team should work with you to make a plan for managing your diabetes.

This checklist will help you make sure your health care team is thorough at your first visit. They should

- measure your height and weight
- measure your blood pressure
- look in your eyes, ask you about any problems you have seeing, and refer you to an eye doctor for a dilated eye exam
- look in your mouth, and ask about your dental health
- feel your neck to check your thyroid gland, and do tests if necessary
- feel your abdomen to check your liver and other organs
- take your pulse

- look at your hands and fingers

- listen to your heart and lungs through a stethoscope

- look at your bare feet, and check the sensation and pulses in your feet

- check your skin, especially the places where you inject insulin

- test your reflexes

- take blood and urine samples for tests

- ask how and when you were diagnosed with diabetes

- ask for results of laboratory tests you had in the past

- ask about your eating habits and weight history

- ask about your current diabetes treatment plan

- ask how often and how hard you exercise

- ask about times you've had ketoacidosis as well as low blood sugar reactions

- ask about infections you've had

- ask what complications you've had and what treatments you've received for them

- ask what medicines you are taking

- ask about factors that make you more likely to get heart disease, such as smoking, high blood pressure, eating and exercise habits, cholesterol levels, and family history

- ask what other medical problems you've had

- ask who else in your family has diabetes

- ask about problems you may have had while pregnant

Putting together a diabetes care plan is an important part of your first visit. Your diabetes care plan will not be the same as everyone else's. To work well, the

plan must be adapted to your own life. For example, it needs to take into account your work or school schedule, how active you are, what and when you like to eat, your cultural background, and other medical problems you have.

You need to be involved in devising your diabetes care plan. Otherwise, it's unlikely that the plan will fit into your life or that you will understand what you need to do.

Is your diabetes care plan complete? If so, it should include:

- a list of goals (both short term and long term)

- a list of the medicines that you will use to control your diabetes

- advice from a dietitian on eating

- a list of changes you have agreed to make in your life, such as getting more exercise or stopping smoking

- teaching sessions for you and your family on how and when to measure your blood sugar levels and urine ketones, how to keep records of these, and how to treat low blood sugar reactions

- a plan for seeing an eye doctor

- a plan for seeing a foot doctor, if you need to

- a plan for seeing other specialists, if you need to

- instructions on when to come back and when you should call

- a birth-control and prepregnancy plan

- a plan for caring for your teeth and seeing the dentist

- a plan for sick days

Future Visits

How often you should return to your diabetes doctor depends on many things. If you take insulin for your diabetes or if you're having trouble controlling your sugar levels, you should see your doctor at least 4 times a year. Otherwise, you should see your doctor 2-4 times a year. You may need to visit your doctor more often if you have complications or if you are starting a new medicine or insulin program. Your doctor will advise you about when to return. He or she should also tell you other times to call or come back. For example, your doctor may want you to call if you've had nausea or vomiting that make you unable to eat, or if you've had a fever for more than a day. You will need to stay in touch with your doctor by phone every week or even every day if you are making big changes in your diabetes care plan.

When you return, expect the doctor and other members of your health care team to give you a physical examination, take a medical history, run laboratory tests, and fine-tune your treatment program. These later visits are not as in-depth as your first visit, although you should get a complete physical examination once a year. Also, your doctor may order new tests, do other examinations, or refer you to a specialist depending on test results and your needs.

This checklist will help you make sure your health care team does a good job at your follow-up visits. They should

- ask about times you've had high or low blood sugar levels

- ask to see your blood sugar records

- ask what adjustments you've made to your diabetes care plan

- ask what problems you've had in following your diabetes care plan

- ask about symptoms that might indicate you are getting a diabetes complication

- ask what other illnesses you had since your last visit

- ask what medicines you are taking now

- ask if your life has changed in any way

- measure your weight and blood pressure

- look in your eyes

- look at your feet

- take blood for glycated hemoglobin measurement

- once a year, take a urine sample to look for protein and take blood for cholesterol and blood fat tests

- review your treatment plan to measure your progress in meeting goals and see where you are having problems

APPENDIX F

At the Doctor's Office

At the Doctor's Office

The return of your completed questionnaire constitutes your informed consent to act as a participant in this research. During your first visit to your doctor after being told you had type 2 diabetes, did the following happen by either the doctor, nurse, or other office staff?

1. Someone measured my height and weight:

☐ Yes ☐ No ☐ Don't remember

2. Someone measured my blood pressure:

☐ Yes ☐ No ☐ Don't Remember

3. Someone looked into my eyes:

☐ Yes ☐ No ☐ Don't Remember

4. Someone asked me if I had any problems seeing:

☐ Yes ☐ No ☐ Don't remember

5. I was referred to an eye doctor for a dilated eye exam:

☐ Yes ☐ No ☐ Don't Remember

6. Someone looked in my mouth:

☐ Yes ☐ No ☐ Don't Remember

7. Someone asked about my dental care:

☐ Yes ☐ No ☐ Don't Remember

8. Someone felt my neck:

☐ Yes ☐ No ☐ Don't Remember

9. Someone checked my thyroid gland:

☐ Yes ☐ No ☐ Don't Remember

10. Someone checked my liver:

☐ Yes ☐ No ☐ Don't Remember

11. Someone felt my abdomen:

☐ Yes ☐ No ☐ Don't Remember

12. Someone checked my other organs:

☐ Yes ☐ No ☐ Don't Remember

13. Someone took my pulse:

☐ Yes ☐ No ☐ Don't Remember

14. Someone looked at my hands and fingers:

☐ Yes ☐ No ☐ Don't Remember

15. Someone listened to my heart and lungs with a stethoscope:

☐ Yes ☐ No ☐ Don't Remember

16. Someone looked at my bare feet:

☐ Yes ☐ No ☐ Don't Remember

17. Someone checked my feet for feeling and pulses:

☐ Yes ☐ No ☐ Don't Remember

18. Someone tested my reflexes:

☐ Yes ☐ No ☐ Don't Remember

19. Someone took my blood for tests:

☐ Yes ☐ No ☐ Don't Remember

20. Someone took urine samples for tests:

☐ Yes ☐ No ☐ Don't Remember

21. Someone asked how and when I was diagnosed with diabetes:

☐ Yes ☐ No ☐ Don't Remember

22. Someone asked for lab results for tests I had in the past:

☐ Yes ☐ No ☐ Don't Remember

23. Someone asked about my eating habits:

☐ Yes ☐ No ☐ Don't Remember

24. Someone asked about my weight history:

☐ Yes ☐ No ☐ Don't Remember

25. Someone asked about my current diabetes treatment plan:

☐ Yes ☐ No ☐ Don't Remember

26. Someone asked how often and how hard I exercise:

☐ Yes ☐ No ☐ Don't Remember

27. Someone asked if I've had low blood sugars:

☐ Yes ☐ No ☐ Don't Remember

28. Someone asked about infections I've had:

☐ Yes ☐ No ☐ Don't Remember

29. Someone asked about complications I've had and what treatments I've received for them:

☐ Yes ☐ No ☐ Don't Remember

30. Someone asked what medicines I am taking:

☐ Yes ☐ No ☐ Don't Remember

31. Someone asked if I smoke:

☐ Yes ☐ No ☐ Don't Remember

32. Someone asked if I have high blood pressure:

☐ Yes ☐ No ☐ Don't Remember

33. Someone asked about my cholesterol levels:

☐ Yes ☐ No ☐ Don't Remember

34. Someone asked about my family history:

☐ Yes ☐ No ☐ Don't Remember

35. Someone asked about other medical problems I have had:

☐ Yes ☐ No ☐ Don't Remember

36. Someone asked if other family members have diabetes:

☐ Yes ☐ No ☐ Don't Remember

APPENDIX G

Other Doctor's Visits

Other Doctor Visits

These questions refer to any other visits you have had to your doctor after the first visit and concerning your diabetes.

The return of your completed questionnaire constitutes your informed consent to act as a participant in this research.

1. Someone asked about how often I've had high or low blood sugars:

☐ Yes ☐ No ☐ Don't Remember

2. Someone asked to see my blood sugar records:

☐ Yes ☐ No ☐ Don't Remember

3. Someone asked what changes I've made to my diabetes care plan:

☐ Yes ☐ No ☐ Don't Remember

4. Someone asked what problems I've had following my diabetes care plan:

☐ Yes ☐ No ☐ Don't Remember

5. Someone asked about symptoms that might mean I am getting diabetes complications:

☐ Yes ☐ No ☐ Don't Remember

6. Someone asked about what illnesses I had since the last visit:

☐ Yes ☐ No ☐ Don't Remember

7. Someone asked what medicines I am taking now:

☐ Yes ☐ No ☐ Don't Remember

8. Someone asked if my life changed in any way:

☐ Yes ☐ No ☐ Don't Remember

9. Someone measured my weight:

☐ Yes ☐ No ☐ Don't Remember

10. Someone measured my blood pressure:

☐ Yes ☐ No ☐ Don't Remember

11. Someone looked into my eyes:

☐ Yes ☐ No ☐ Don't Remember

12. Someone looked at my feet:

☐ Yes ☐ No ☐ Don't Remember

13. Someone took blood to test my hemoglobin A1c:

☐ Yes ☐ No ☐ Don't Remember

14. Someone reviewed my treatment plan to measure my progress:

☐ Yes ☐ No ☐ Don't Remember

APPENDIX H

My Diabetes Plan

My diabetes plan

These questions refer to the diabetes plan that was developed by you and your diabetes care team.

The return of your completed questionnaire constitutes your informed consent to act as a participant in this research.

1. My plan has a list of short term goals:

☐ Yes ☐ No ☐ Don't Remember

2. My plan has a list of long term goals:

☐ Yes ☐ No ☐ Don't Remember

3. My plan lists the medicines I use to control my diabetes:

☐ Yes ☐ No ☐ Don't Remember

4. My plan includes eating advice from a dietitian:

☐ Yes ☐ No ☐ Don't Remember

5. My plan includes a list of changes I intend to make to take charge of my health:

☐ Yes ☐ No ☐ Don't Remember

6. My plan includes classes for me and my family on taking care of my diabetes:

☐ Yes ☐ No ☐ Don't Remember

7. My plan includes me seeing an eye doctor:

☐ Yes ☐ No ☐ Don't Remember

8. My plan includes me seeing a foot doctor:

☐ Yes ☐ No ☐ Don't Remember

9. My plan includes instructions on when to come back to my primary doctor:

☐ Yes ☐ No ☐ Don't Remember

10. My plan includes instructions on when to call my primary doctor:

☐ Yes ☐ No ☐ Don't Remember

11. My plan includes seeing a dentist:

☐ Yes ☐ No ☐ Don't Remember

12. My plan includes information on what to do when I am sick:

☐ Yes ☐ No ☐ Don't Remember

APPENDIX I

The Final Say

The Final Say

These are open ended questions concerning your health care, diabetes and how you feel about these issues. Please feel free to write as much or as little as you want. The return of your completed questionnaire constitutes your informed consent to act as a participant in this research.

1. When was the last time you visited the doctor for your diabetes?

2. How many times in a year do you see your doctor for your diabetes?

3. Prior to getting diabetes, did you think you were at high risk for getting diabetes?

4. When looking for information on diabetes - where do you look?

5. What role has the internet, email and discussion boards played in how you take care of your diabetes?

6. List some things you do when you are on the internet.

7. How long have you used the internet?

8. Can you think of anything that would make it easier for you to take care of your diabetes?

9. List 5 things that prevent you from getting the healthcare you need.

10. Any other comments: