

Report on the 2007 Northern Michigan Diabetes Initiative Community Diabetes Survey

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I. Executive Summary

Introduction and Purpose: The Northern Michigan Diabetes Initiative (NMDI) is a collaborative community based effort to reduce the incidence of diabetes and improve the care of people already diagnosed with diabetes. Key partners include Munson Healthcare (a 7 hospital regional health system), Priority Health (a non-profit insurance provider), TIPDON (State-funded diabetes outreach network), regional health care providers and practices, and local public health departments. In late 2007, a telephone interview survey was conducted targeting the general adult population of the 11 county primary service area of the seven affiliated hospitals within the Munson Healthcare System. The purpose of the survey was to learn more about the prevalence of diabetes and risk factors, as well to identify gaps in diabetes care and public knowledge in order to guide and inform project efforts. The survey was also designed to provide baseline population data against which future progress could be measured.

Methods: With the approval and backing of the NMDI Steering Committee as well as the Munson Community Health Committee, project representatives proceeded with development of the survey tool and study protocol. Where possible, questions from existing standardized national survey tools were used in order to allow for comparison of regional results to State and national findings. The study protocol received approval from the Munson Healthcare Institutional Review Board, whose purpose is to ensure that any research conducted with Munson involvement meets ethical standards and affords adequate protection to human subjects. The original study proposal called for a sample size of 1,000 respondents, including sub-samples from four specific target groups large enough to analyze separately. These groups included adults age 45 years and older, adults with diabetes, parents of children younger than 18 years, and uninsured adults. A total of 1,001 interviews were completed, however the sub-sample of uninsured adults was too small to analyze separately. The Research Services Department at Northwestern Michigan College was contracted to obtain the sample, conduct the phone interviews and collect the data. Data analysis was performed by the Munson Community Health Coordinator. The Michigan Department of Community Health Diabetes Epidemiologist provided technical assistance with sample weighting and other statistical issues.

Key Findings: More than one quarter (28.4%) of adults in the region have been diagnosed with diabetes or pre-diabetes, signifying the magnitude of this public health issue. The total adult prevalence estimate for pre-diabetes was 15.0%; and the prevalence estimate for diabetes was 13.4%. This was higher than expected and higher than previous estimates for the region, but is acknowledged to be more accurate than previous estimates due to the large sample size and sampling design used by the survey. The regional prevalence estimate of 13.4% is higher than both the 2006 State average (9.0%) and 2006 U.S. national median of 7.5%. Probable explanations for this disparity include the concentration of older people in the 11 county population and a higher incidence of risk factors, especially obesity. The high screening rates found by the survey also suggest that the higher prevalence estimate may also be due in part to a higher rate of testing and diagnosis rather than or along with higher actual disease incidence.

Overall, 53% of adults in the survey reported that either they themselves or an immediate family member have been diagnosed with diabetes. The majority of families in the region are touched by diabetes. The sheer magnitude of diabetes, along with the human and societal toll that this disease takes, makes the need for quality, cost-effective systems of care all the more urgent.

The very high combined prevalence of adults already diagnosed (with pre-diabetes or diabetes – 28.4%) and undiagnosed but at risk according to ADA risk criteria (21.1%) signals the need for universal education. Survey results suggest that people who already have a diagnosis and those who are undiagnosed but at high risk constitute 50% of the entire adult population. Furthermore, only 38% of those actually at elevated risk for diabetes reported that they personally feel at risk for diabetes, identifying a significant gap in public perception. Family history was the most frequently cited (73%) reason for feeling at risk. However, being overweight (which actually increases risk more than family history), was cited by only 27% as a reason for feeling at risk, highlighting the need for increased public awareness of controllable risk factors.

People with diabetes have high rates of risk factors that further jeopardize their health generally, and put them at increased risk for cardio vascular disease in particular. The majority of people with diabetes reported obesity or overweight (79%, with 51% reporting obesity) and a history of hypertension (72%) and high cholesterol (56%). These rates are significantly higher than among non-diabetic people. Generally, there were low percentages of people with diabetes who were able to name key strategies for lowering cardio vascular risks, in particular blood sugar control (28%), losing weight (13%), taking medications (15%) and controlling cholesterol (6%).

While regional rates found by the survey are slightly better than State and national rates, still fewer than half of all people with diabetes received all three primary ADA-recommended preventive services (semi-annual HbA1c testing, annual eye and foot exams). The leading reasons reported for not obtaining services were concern about insurance coverage, feel they don't need it, not ordered by provider, and unaware of need. One of the most significant findings of the survey was that people with diabetes who reported ever receiving diabetes education were three times more likely to be aware of the need for services, as well as three times more likely to have actually obtained all three primary ADA-recommended preventive care services. All of these findings highlight the need for both increased education, and systems of care which are more effective at delivering secondary prevention services.

Survey findings related to general public knowledge and awareness related to diabetes suggest a very high level of awareness (92% of parents and 94% of the general adult population) that U.S. childhood obesity and diabetes rates are at an historic high. However, only 54% were aware of general diabetes screening recommendations, and 32% knew of the high prevalence of pre-diabetes. Very few (14%) recognized advancing age as a primary diabetes cause or risk factor.

Survey findings related to awareness of community diabetes education opportunities suggest that health care providers come to mind most frequently (46%), followed by local hospitals (37%). Less than half of all respondents reported that they follow diabetes news stories very closely or somewhat closely, with people with diabetes not surprisingly reporting the highest levels of interest. Among all adults, the most commonly reported sources for general health information were health care provider, TV, and family members. For younger age groups (through age 54), the internet was also a frequently cited source.

These results provide support for the NMDI project strategy of promoting a deeper involvement of health care providers in assuring that their patients receive diabetes education and also suggests that broad-based community outreach efforts to deliver educational messages to family members may be an effective strategy as well. Examples of possible outreach points include church, civic, school, employer and recreational community groups. TV and the internet are also likely to be effective outlets for the planned educational media campaign.

II. Background & Introduction to the Northern Michigan Diabetes Initiative and Survey

The Northern Michigan Diabetes Initiative (NMDI) is a collaborative effort of Munson Healthcare (including seven affiliated hospitals), Priority Health (a non-profit insurance provider), TIPDON (State-funded diabetes outreach network), County Health Departments and other stakeholders from the Munson Healthcare eleven county geographic service area in Northern lower Michigan. The region is mostly rural, and has experienced significant recent growth in total population and population of residents over the age of 45. Diabetes is a leading health care issue in the region, and is reported as the primary or secondary diagnosis for more than 20% of all hospital admissions in the region. The NMDI was formed with the long term goals of reducing the incidence of diabetes and improving the care of people with diabetes. Three strategies were selected as areas of focus: 1) Education of providers on best practices and standards for prevention and treatment of pre-diabetes and diabetes, including promoting the consistent use of best practices across the region; 2) Increased public awareness of diabetes and community engagement in addressing the issue; and 3) Improvement in patient education, and diagnostic as well as treatment practices and systems, including providing support at the local and regional level for integrating the Chronic Care Model into clinical practice. The collaboration allows partners to work together to adopt consistent and clear messages and to develop common intervention strategies.

In November of 2007, the Northern Michigan Diabetes Initiative conducted a telephone survey of 1,000 adults living in the 11-county Grand Traverse region of Northwest Michigan. The purpose of the study was to gain a better understanding of the significance of diabetes in the local area, and to identify priorities for community and provider education efforts. More specifically, the survey was developed to provide a “baseline” profile for the 11 counties for key indicators that the NMDI is trying to impact, against which future progress could be measured. Prior to the survey, accurate diabetes prevalence estimates for the 11 county regional population were not available. Estimates based on statewide data had wide error margins, and did not include prevalence of prediabetes, risk factors, or measures of quality of care for people with diabetes. In addition, only anecdotal information was available related to diabetes and pre-diabetes related community awareness, perceptions and attitudes. The survey therefore provided a unique opportunity to better understand and document prevalent attitudes and gaps in basic knowledge about diabetes among the public. Because the NMDI had planned to implement public information and community education campaigns, the survey was designed in part to clarify what messages were most needed.

Process and Methodology

The proposal for a community wide diabetes survey was presented to both the Steering Committee of the NMDI and to the Community Health Committee, a standing committee of Munson Healthcare which includes members of the Board of Directors, corporate members and community representatives from across the entire 11 county geographical

area. With approval to proceed from both of these bodies, a committee of NMDI staff and stakeholders was formed to guide development of the actual survey tool. The committee met several times and reviewed several versions before the tool was finalized. (A list of the survey committee members is included in appendix 1). A number of publicly available national and regional tools were reviewed in an effort to identify questions that were already pretested and validated with a general population. Using questions from existing tools allowed for comparison of regional results to previous State and national findings. The following publicly available tools were reviewed and used in question formation:

- 2005 Behavioral Risk Factor Surveillance Survey (BRFSS), Centers for Disease Control and Prevention;
- 2006 National Health Interview Survey (NHIS), Centers for Disease Control and Prevention;
- 2006 National Survey of Public Attitudes, Knowledge, and Practices Related to Diabetes” National Diabetes Education Program (used with special permission);
- American Diabetes Association Risk Test (www.diabetes.org/risk-test/text-version.jsp);
- Diabetes Attitude Scale (DAS-3), Diabetes Knowledge Test (DKT), Diabetes Care Profile (DCP), Michigan Diabetes Research and Training Center

The final survey tool was submitted with a full study protocol for review by the Munson Healthcare Institutional Review Board. The proposal was deemed eligible for an expedited review, and full approval was granted. The survey tool (included in appendix 2) included a total of 72 items, organized into five sections:

- Section 1: to assess diabetes, pre-diabetes, and diabetes risk status (administered to all respondents);
- Section 2: to assess receipt of preventive care and knowledge of recommendations among people with diabetes (administered only to people reporting a diagnosis of diabetes);
- Section 3: to assess knowledge of key messages and facts about diabetes (administered to all respondents);
- Section 4: to assess public attitudes and education needs (administered to all respondents); and
- Section 5: to collect basic demographic data about respondents (administered to all respondents)

Sample Design & Data collection

The original study proposal included plans to sample a total of 1,000 adults from the 11 county area, including adequate numbers for sub-samples from four target demographic groups. Results specific to each of these groups would be used to guide specific prevention interventions and educational activities planned by the Initiative. These four target groups were adults with type 2 diabetes, people over the age of 45 years (therefore at increased risk for diabetes), parents of children under the age of 18 years, and adults

without health coverage. It was hoped to obtain adequate sample sizes of each of these groups by sampling the general adult population. Adequate numbers were obtained to yield statistically meaningful results for three of the four target groups. The sub-sample of adults with diabetes was not as large as originally targeted, but adequate to analyze as a separate group. Consequently results had fairly wide 95% confidence intervals. The sub-sample without health coverage was too small to analyze separately.

The Research Services department at Northwestern Michigan College was contracted to obtain the sample and collect the data. Research Services purchased 9,000 Random Digit Dial (RDD) numbers from Survey Sampling International (SSI). The numbers were generated for the 11 county area included in the survey project. The numbers were pulled in 90 replicates of 100 (strata), with each county represented proportionate to the total 11 county population; 2,362 numbers were identified as disconnects and removed, leaving 6,638 available numbers (sampling frame). Numbers provided by SSI were divided into a series of 1,000 numbers (“Reps”) and printed for callers to dial manually. Starting in September 2007, callers made a minimum of six attempts (two in the morning, two in the afternoon and two in the evening) on different days to reach a number, exhausting all numbers before moving to the next “Rep”. Calling was completed with a total of six complete Reps and one partial Reps of 638 numbers. After the original sample was exhausted, additional completed surveys were needed for three counties to ensure adequate representation based on county population distributions. An additional 1,500 numbers were purchased from Survey Sampling International for these three counties. Fifteen replicates of 100 numbers were obtained. After screening for disconnects, 1,158 numbers were available to call. Calling on the additional sample began in late November 2007 and continued until 1,000 surveys were completed.

Data was entered using a Computer Assisted Telephone Interview (CATI) system operated by trained phone interviewers. Interviewers obtained verbal informed consent from each respondent before proceeding with the interview questions.

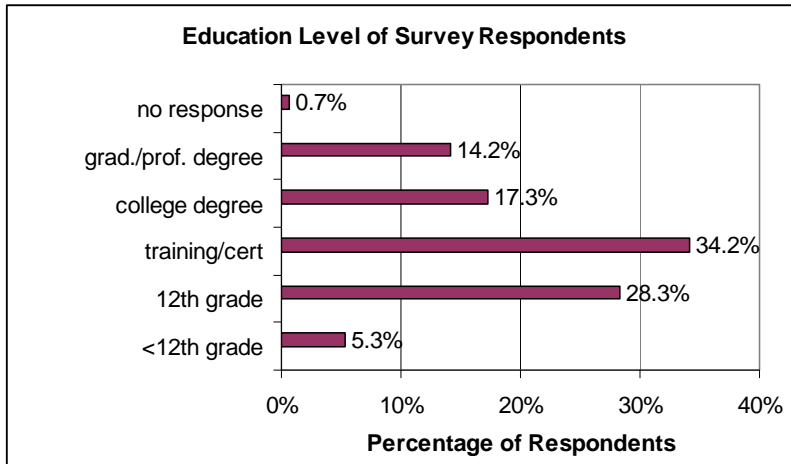
Description of the Sample

Preliminary frequency analyses of unweighted data were run by Northwestern Michigan College and reviewed with the Survey Coordinator for initial exploration of results. The final total sample size was 1,001 respondents. Of these, 748 were age 45 years or older, 168 had diabetes, 263 had children in their household under the age of 18 years, and 63 reported no health care coverage.

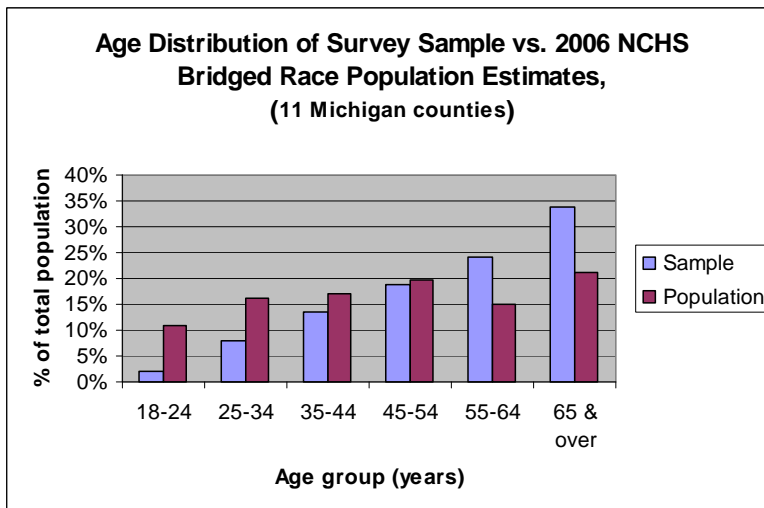
Key characteristics of survey respondents included:

- 71% were women;
- 76% were over the age of 45 years, 34% were age 65 or older;
- 97.7% reported their race as White, 3.5% American Indian, 1.1% African American or Other (respondents could report more than one race);
- 27% had children under the age of 18 in their household;
- 6.4% had no health care coverage (9.4% of those age <65 years);
- 6.3 % had Medicaid coverage (7.0% of those age <65 years)

The chart below shows the variation among respondents in highest education level obtained:



A comparison of the age distribution within the sample to 2006 population estimates revealed an overrepresentation of older people in the survey sample:



As the sample description above shows, the sample was skewed toward older respondents, and women were overrepresented as well. In order to obtain findings that would be an accurate representation of the actual adult population in the 11 counties, the data needed to be adjusted for these sampling biases. With assistance from the Michigan Department of Community Health Diabetes Statistician, sample weighting and post-stratification weighting factors were developed to account for the sampling design (unequal probabilities of selection among the 11 counties – the population from each county did not have equal probability of being called), as well as to adjust for the overrepresentation of women and older age groups among actual respondents, compared to population estimates for the 11 county region. The sample weighting was calculated using the inverse of the sampling fraction (the number of phone numbers in the sample out of the total number of phone numbers available) by county. The post-stratification

weighting factors were calculated using the gender-age ratios of the 2006 National Center for Health Statistics (NCHS) bridged-race population estimates for the 11 county region.

Both the raw data and weighted data were analyzed using the statistical software application Statistical Package for the Social Sciences (SPSS). A variety of frequency analyses, measures of association, as well as significance testing and confidence intervals for select measures were calculated using the weighted data. Results were analyzed by gender and age group, and presented where meaningful differences were found. Results were not analyzed by separate counties because the sample size for any one county was too small to draw meaningful conclusions specific to that county. Weighted survey results for the 11 county region were compared to findings from other State and national data sources where available. Data sources that were used for comparative analyses included:

- 2006 CDC BRFSS results for the U.S.
- 2006 National Survey of Public Attitudes, Knowledge, and Practices Related to Diabetes” National Diabetes Education Program, conducted with a national sample of adults age 45 years and older. (Full survey results have not yet been released, the limited results used in this report for comparative purposes have been published in the publicly available NDEP Update Newsletter);
- 2006 Michigan Department of Community Health (MDCH) Behavioral Risk Factor Surveillance (BRFS) results for Michigan.
- 2006 MDCH BRFS results for a 21 county North West Michigan regional subsample that contains the 11 counties included in the survey. This 21 county subsample was compiled and analyzed for a report commissioned by the North Central Council of the Michigan Hospital Association.
- 2005 MDCH BRFS results for the 11 county survey area. In 2005 MDCH sampled a larger than usual number of people which allowed for separate analysis of smaller regional units. Through a special request, MDCH provided BRFS results for the same 11 county region included in the diabetes survey.

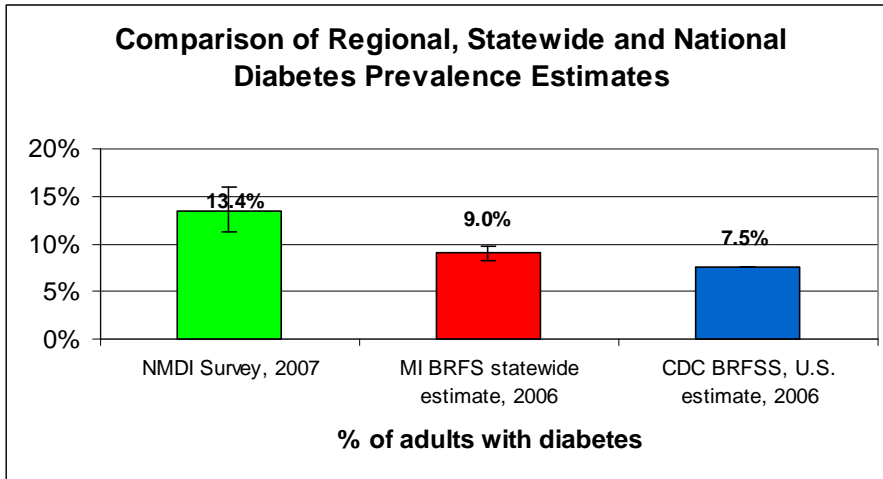
Findings

Findings are grouped by major content areas and presented below. Where relevant, findings are broken out by specific target group (people with diabetes, adults age 45 years and older, and parents of children under age 18 years).

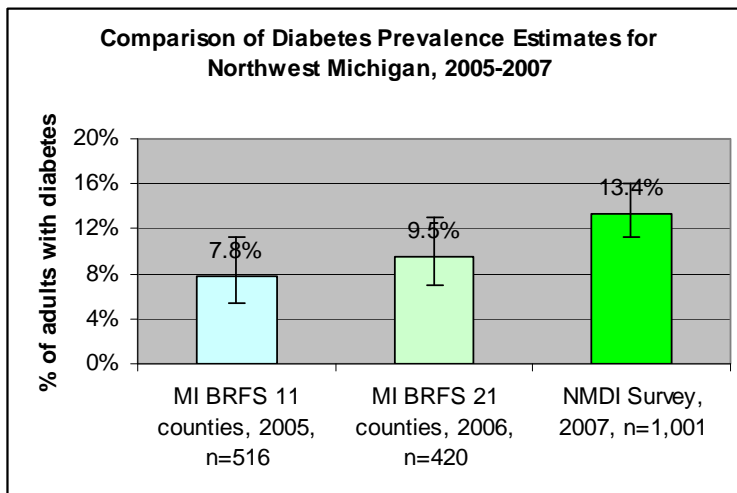
Prevalence of Diabetes

Over 53% of adults in the survey reported that either they themselves or an immediate family member has been diagnosed with diabetes. Based on weighted survey results, overall, 13.4% of adults in the 11 county region have been diagnosed with diabetes; this is higher than the estimated Statewide prevalence of 9%, and U.S. rate of 7.5% (2006 BRFSS). The 95% confidence levels (shown by the I-bars on the chart below) do not overlap suggesting that the prevalence is truly higher in the region than across the state and nationally. Several factors may account for a higher diabetes prevalence in the 11 county region, including a higher concentration of older people in the region than in the

State and nation as a whole (age is a leading risk factor for diabetes), as well as slightly higher rates of overweight and obesity. Another factor could be higher diagnosis rates due to higher rates of testing and screening compared to State and national averages, but data are not readily available to confirm the degree to which differential diagnosis accounts for the higher regional rate.

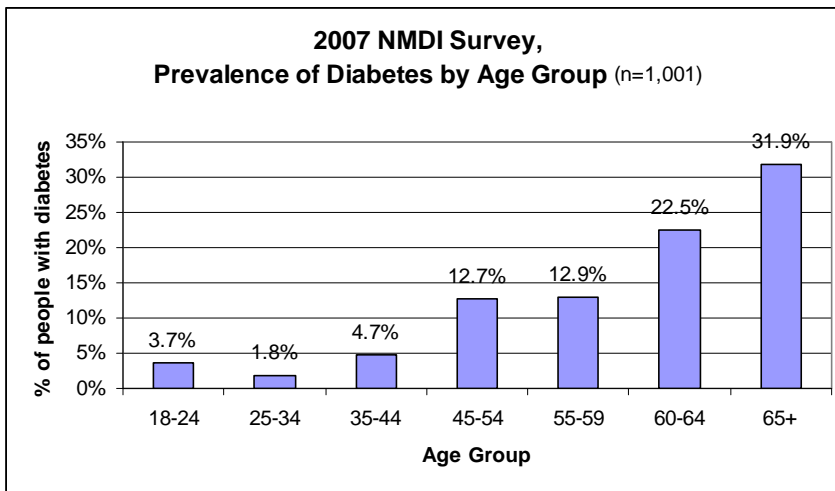


The adult diabetes prevalence estimate generated by the survey (13.4%, 95% CI 11.21%-15.99%) is higher than the estimate obtained from the 2005 MDCH BRFS results compiled for the same 11 county region (7.8%, 95% CI 5.4%-11.2%), and also higher than the 2006 MDCH BRFS results for the 21 Northwest Michigan counties which include the 11 county survey region (9.5%, 7.0%-13.0%). All of the confidence intervals overlap, but the NMDI survey estimate is clearly the highest, and has the most narrow confidence interval. Therefore, the NMDI survey estimate is likely to be the most accurate given how much larger the sample size is compared to the other two sources (both derived from MDCH MI BRFS survey data) for the same region.



In addition to being a more precise estimate of the true diabetes prevalence in the population, other minor factors which may contribute to the higher prevalence rate found by the NMDI survey could be an actual increase in disease prevalence between 2005 (year of the MDCH BRFS survey), and 2007 (year of the NMDI survey), as well as a significant change in clinical practice between 2005 and 2007 in the region resulting in increased diagnosis rates rather than, or in addition to a true increase in disease prevalence.

As expected, the age distribution displayed in the chart below shows that the prevalence of diabetes increases sharply with age. Almost one third (32%) of people in the region over the age of 65 years have been diagnosed with diabetes.

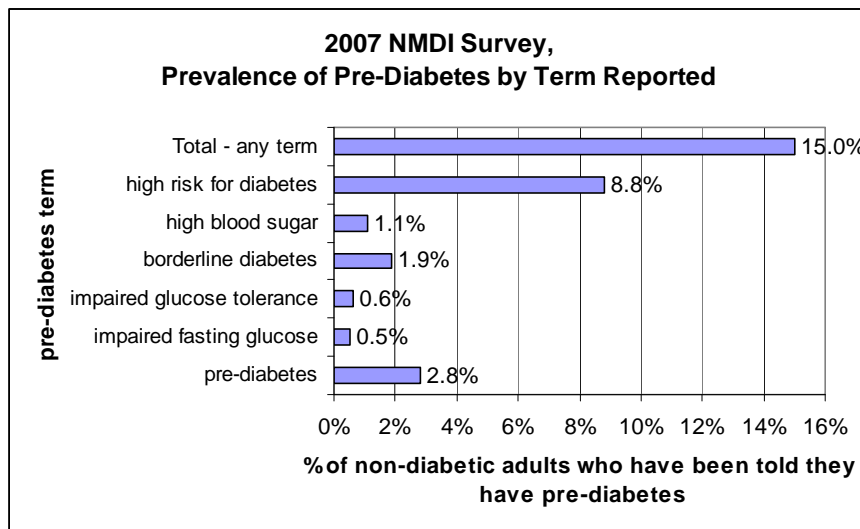


Based on reported age at diagnosis, 3% of diabetes cases among respondents were probable Type 1's, and 97% were probable Type 2's. Among the probable type 2's, the average age at diagnosis was 52.4 years. Men were more likely than women to report having a diabetes diagnosis (16.3% vs. 10.8%), and this gender difference was found to be significant using the Chi-square test ($p < .02$).

Prevalence of Pre-Diabetes

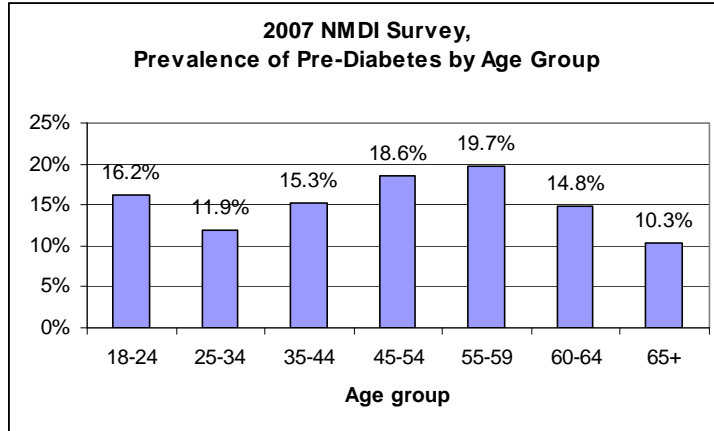
Pre-Diabetes is a condition which places people at high risk of developing type 2 diabetes. The American Diabetes Association diagnosis criteria for pre-diabetes is a fasting blood sugar between 100 to 125 (higher than 125 is considered diabetes). A variety of medical terms are in common usage to refer to a medical diagnosis of “pre-diabetes”, including “impaired glucose tolerance”, “impaired fasting glucose”, “borderline diabetes”, “high blood sugar”, and “high risk for diabetes”. Inconsistent use of terms by health care providers and differential recollection or confusion over terms among patients makes estimating a pre-diabetes prevalence difficult. Based on input from diabetes educators in current practice, the survey committee chose to interpret a report of having “been told by a health care provider that you are at high risk for diabetes” as a diagnosis of pre-diabetes. During the survey interviews, respondents who did not already report a diagnosis of diabetes were asked about their pre-diabetes status

using all of these terms in order to estimate the prevalence of pre-diabetes in the population as closely as possible. Among people without an established diabetes diagnosis, 15.0% reported being told by a health professional that they have pre-diabetes, using one of the terms above. This is substantially lower than the national estimate of a 40% adult pre-diabetes rate, suggesting that the majority of adults in the 11 county area are not aware of their pre-diabetic status, assuming that the true local prevalence is similar to national estimates. The most commonly reported terms for a pre-diabetes diagnosis were “high risk for diabetes” and “pre-diabetes”.

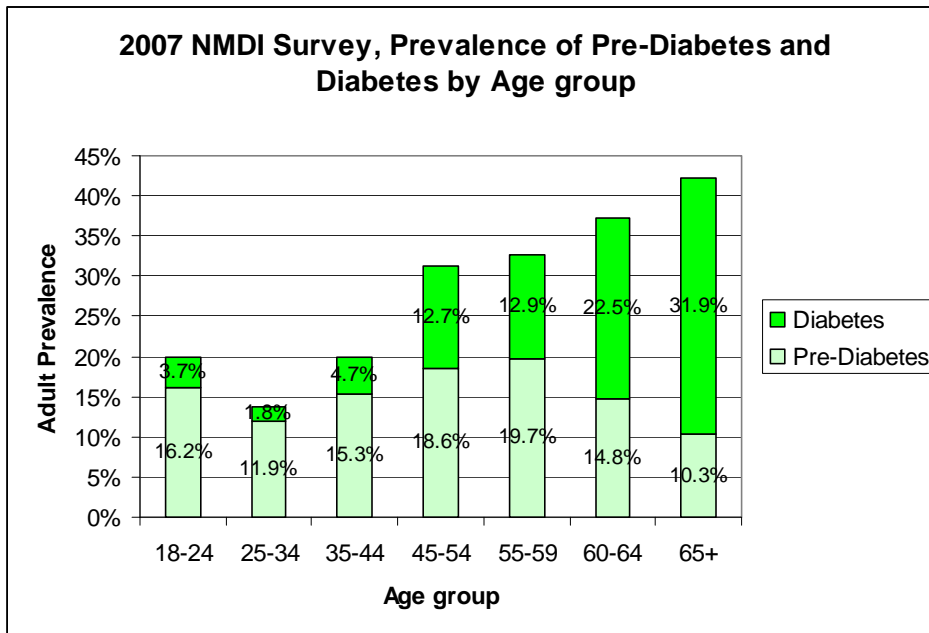


An analysis of pre-diabetes prevalence by age group showed a general trend of increased diagnosis with age until age 60 years when rates seem to decrease. There was an unexpectedly high rate within the 18 to 24 years age group. Within this group, 10.8% reported a pre-diabetes diagnosis as “having been told by a health care provider that you are at high risk for diabetes”. 100% of these individuals also reported a BMI in the obese category. It is possible that some of these individuals have not actually had a diagnosis of pre-diabetes based on glucose testing, but were simply told they are at high risk because of their weight.

The apparent decrease in pre-diabetes prevalence starting at age 60 could be the result of many people shifting from pre-diabetes to diabetes as they age, or moving directly from normal glucose tolerance to diabetes without the interim diagnosis of pre-diabetes. While there were difference among age groups, there was not a significant difference between men and women in the percentage reporting pre-diabetes.



When the prevalence of diabetes and pre-diabetes is added together and charted across age groups, the expected trend of increased numbers of people affected by one or the other can be seen:

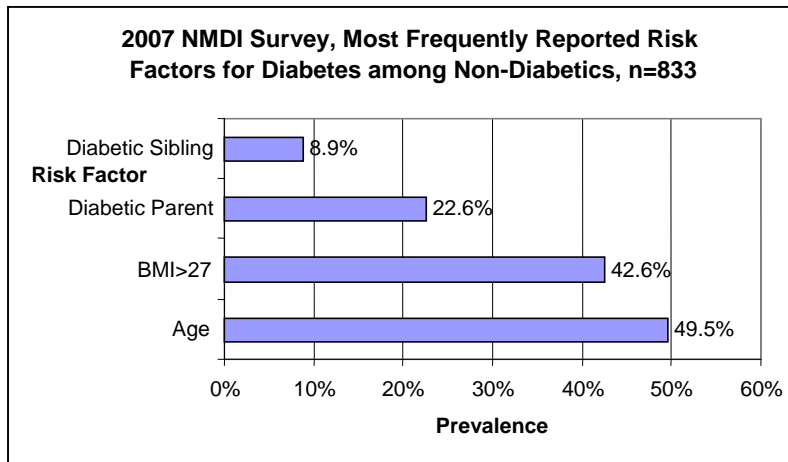


Prevalence of Risk Factors for Diabetes among Non-Diabetics

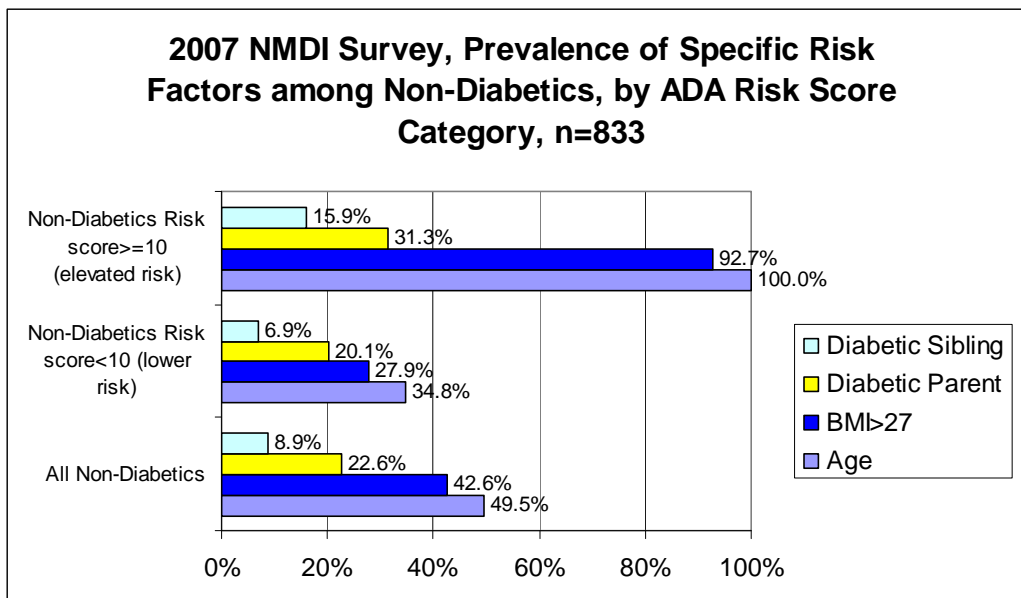
The most significant risk factors for diabetes are age, weight, and family history. In order to estimate the percentage of non-diabetic or “not yet diagnosed” people in the 11 county population who are at increased risk for diabetes, the survey incorporated questions from the American Diabetes Association (ADA) Risk Test (www.diabetes.org/risk-test/text-version.jsp), included in the appendix). The ADA Risk Test assigns between 0 and 9 points for each of seven risk factors. Six of these factors were incorporated into the survey including age, Body Mass Index, 1st degree relative with diabetes, and birth of a baby weighing more than 9 pounds. A total score of 10 or more indicates an elevated risk

for diabetes. Among non-diabetic or “not yet diagnosed” people, a total of 22.7% were found to be at elevated risk for diabetes according to the ADA Risk Test. Among those age 45 years or older, 46% were at elevated risk, which was the same rate found by the national NDEP survey of people age 45 and older. This estimate should be interpreted as conservative as the survey did not include the seventh risk factor “under 65 years of age and get little or no exercise during a usual day”. If it had been included, it is likely that a greater percentage would have been found to be at elevated risk.

The prevalence of specific risk factors is presented in the chart below. The most common risk factors other than age were high BMI and a parent with diabetes.

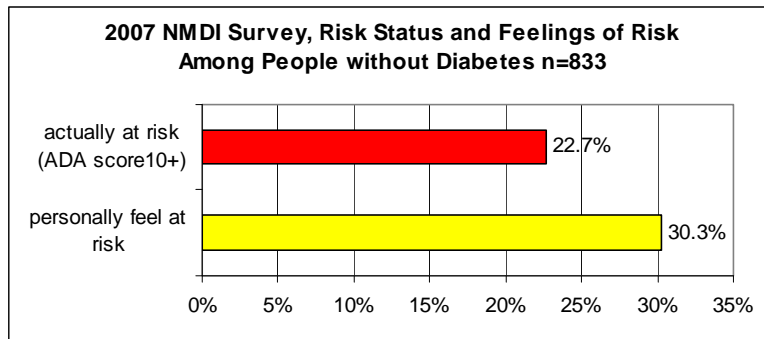


Stratifying the risk factor prevalence data by ADA risk category (score above and below 10 points), reveals that other than age, high BMI (27+) is much more frequent among those at elevated risk (score ≥ 10 points) than among those with lower risk (score < 10 points).

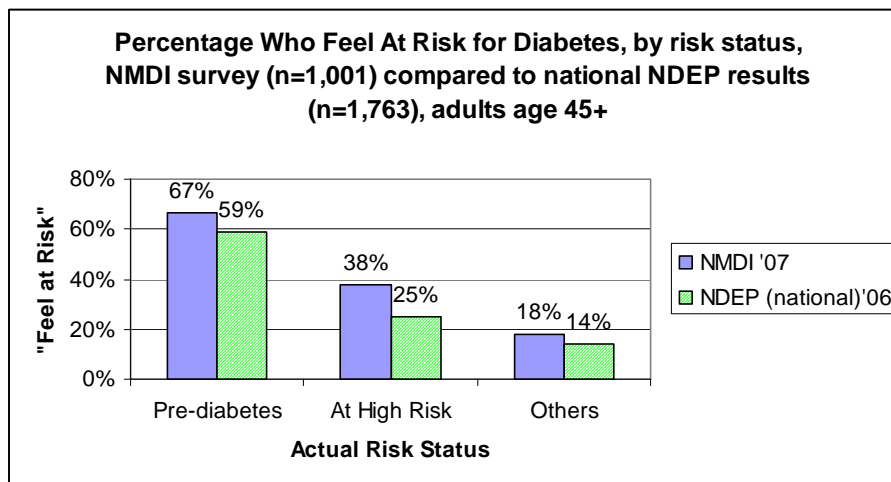


Identifying people at elevated risk for diabetes who have not yet received a diagnosis of diabetes allowed for exploration of awareness and attitudes about risk as well as history of blood sugar screening. Results suggest that overall screening rates are high. The ADA recommends that all people age 45 years and older have a fasting blood sugar test at least every 3 years. Among survey respondents, 69% of non-diabetics age 45 years and older reported having had their blood sugar tested within the last 3 years.

Interestingly, a greater percentage of people reported personally feeling at risk for diabetes than the percentage who actually are at elevated risk:

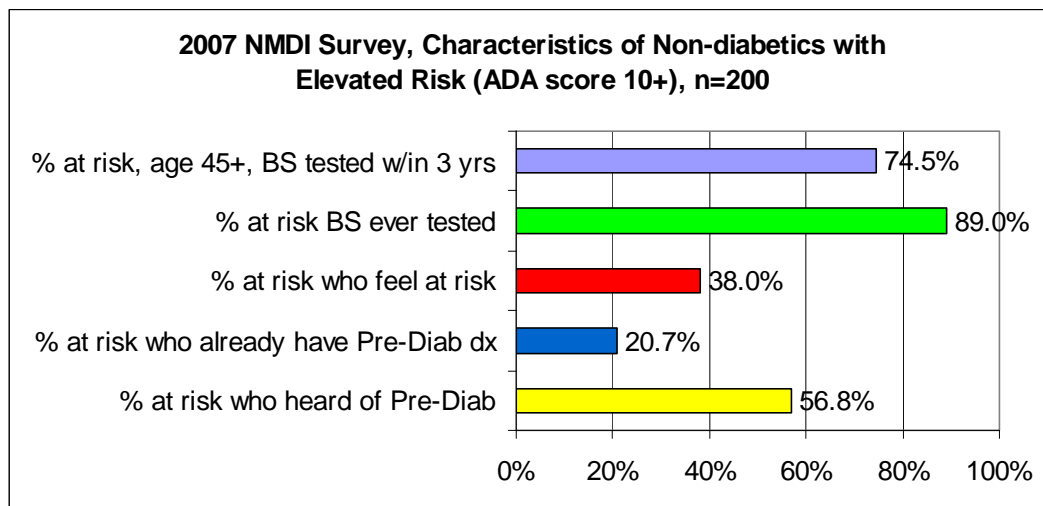


Further analysis reveals that these two groups (actually at elevated risk, and personally feel at risk) do not overlap as much as would be expected. Among all non-diabetics with an ADA risk score of 10 or more (elevated risk), only 38% - less than half – reported that they personally feel at risk. This was slightly higher than the National Diabetes Education Program (NDEP) national survey results, which found that only 25% of at risk people reported feeling at risk for diabetes.

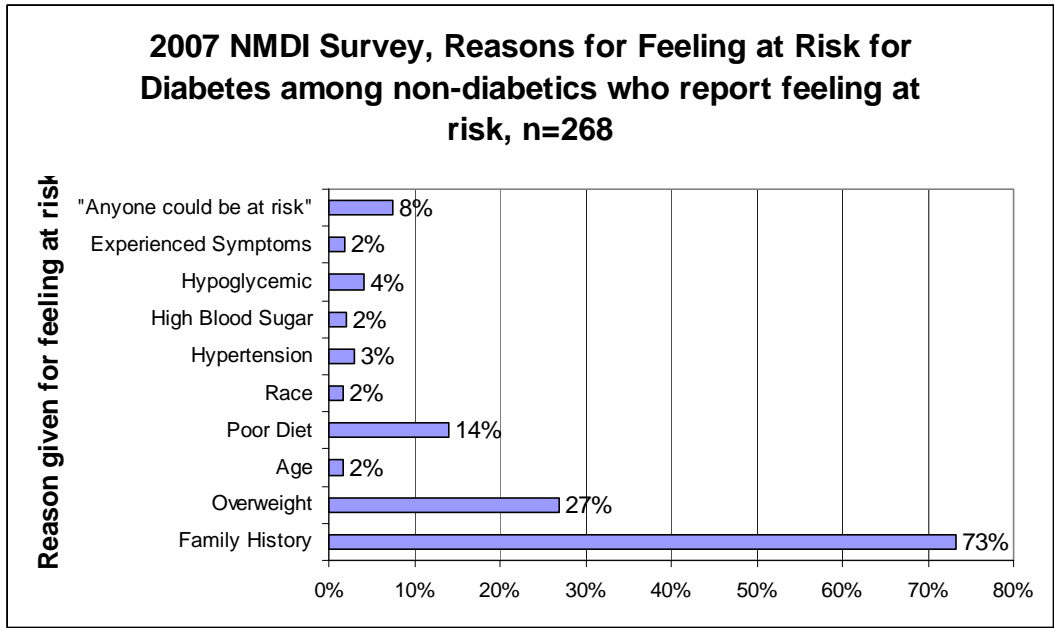


Among all non-diabetic respondents with an ADA risk score below 10 (low risk), 28% reported personally feeling at risk. These results suggest a significant number of what is sometimes referred to as ‘the worried well’ as well as a significant number of people at risk who minimize or do not realize their risk.

Other characteristics of non-diabetic people at elevated risk (ever had blood sugar tested, already received pre-diabetes diagnosis, and had heard of the term pre-diabetes) which are related to awareness are presented in the chart below. Of particular note are the low percentage of at risk people reporting familiarity with the term “pre-diabetes” (56.8%), and the high percentage (89%) who report ever having been screened (“blood sugar levels tested”). It is hard to know how accurate this implied screening rate is, based on anecdotal reports of patients regularly being unaware of specific lab tests that are performed. They may assume that any lab test involving a blood draw included blood sugar testing. Groups within the population who are at the highest risk for developing pre-diabetes and diabetes are the focus of primary prevention efforts. All of these results suggest that building a basic recognition and awareness of pre-diabetes as a critical “prevention period” is needed.



In order to explore the issue of perception and awareness of risk further, non-diabetic respondents who reported “personally feeling at risk for diabetes” were asked an open ended question about their reasons for feeling at risk (a list of possible responses was not read to respondents). Responses were combined into the categories below. It should be noted that while age is in actuality the leading risk factor, few respondents (only 2%) cited age. This could be due to lack of awareness of age as a primary risk factor, or perhaps because it is a factor that cannot be reduced or impacted in any way. Likewise, family history was much more likely to be reported as a reason for feeling at risk than being overweight, however, high BMI actually increases risk more than family history. Family history was the most frequently cited reason for feeling at risk both in the NMDI survey (73%) and the national NDEP survey of people age 45 and older (60%).

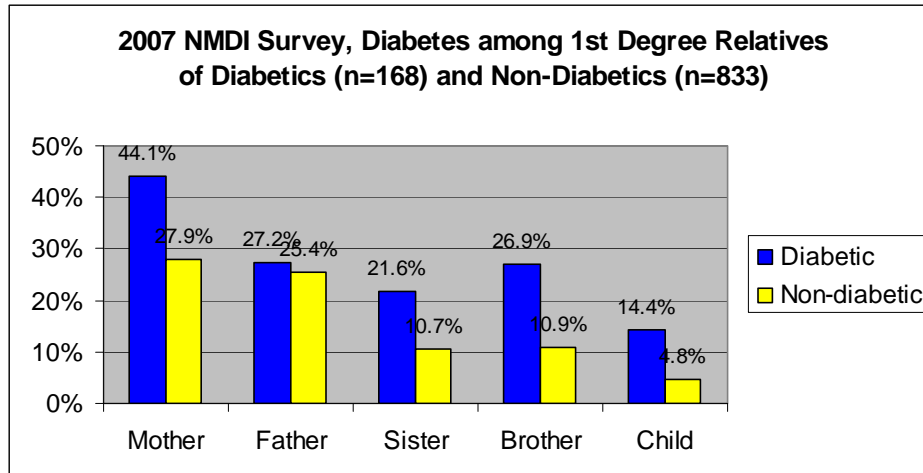


Characteristics of People with Diabetes and Awareness Related to Diabetes Management

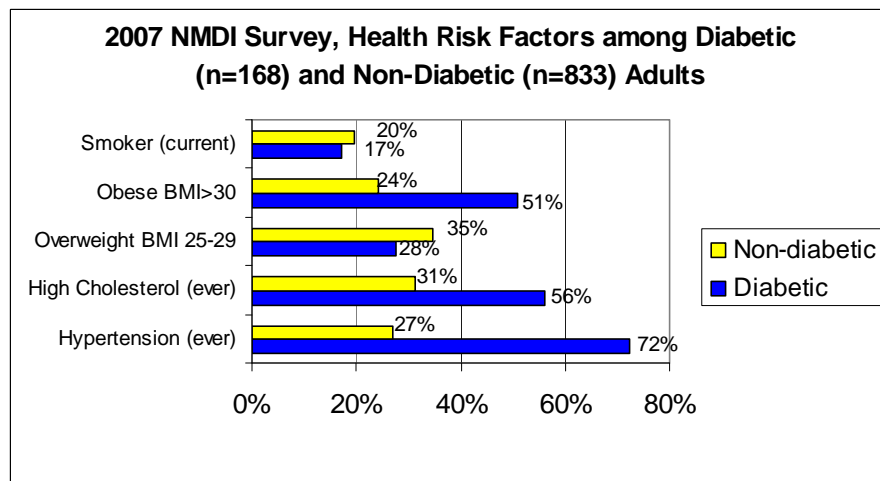
A number of measures were looked at separately for the sub-sample in the survey who reported a diabetes diagnosis. While these results specific to people with diabetes can be used to identify issues for further exploration and verification, findings should be interpreted with caution as the sample size (n=168) is relatively small.

Survey results for people with diabetes suggest that they are not significantly different from people without diabetes with regard to health care coverage and education level. About two-thirds, or 67% of people with diabetes reported having ever received diabetes education. Education was specified as “attended a series of classes or series of meetings with a diabetes educator”.

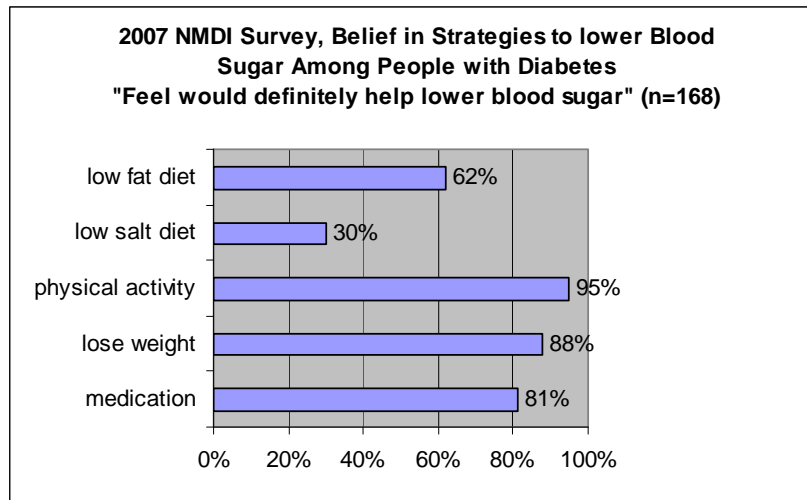
People with diabetes were more likely than people without diabetes to have first degree relatives who also had diabetes. Overall, 42.3% of people with diabetes had a first degree relative (parent or sibling) with diabetes. It was also more common to report having a spouse with diabetes, but the difference between diabetics and non-diabetics was not statistically significant in this instance. Among people with diabetes who had a first degree relative with diabetes, maternal history appears most common, with 44% reporting that their mothers had diabetes. It is not clear why maternal history was reported much more frequently than diabetes among other relatives. It is possible that respondents were more familiar with their mothers’ medical histories than their fathers, and therefore more likely to report a history.



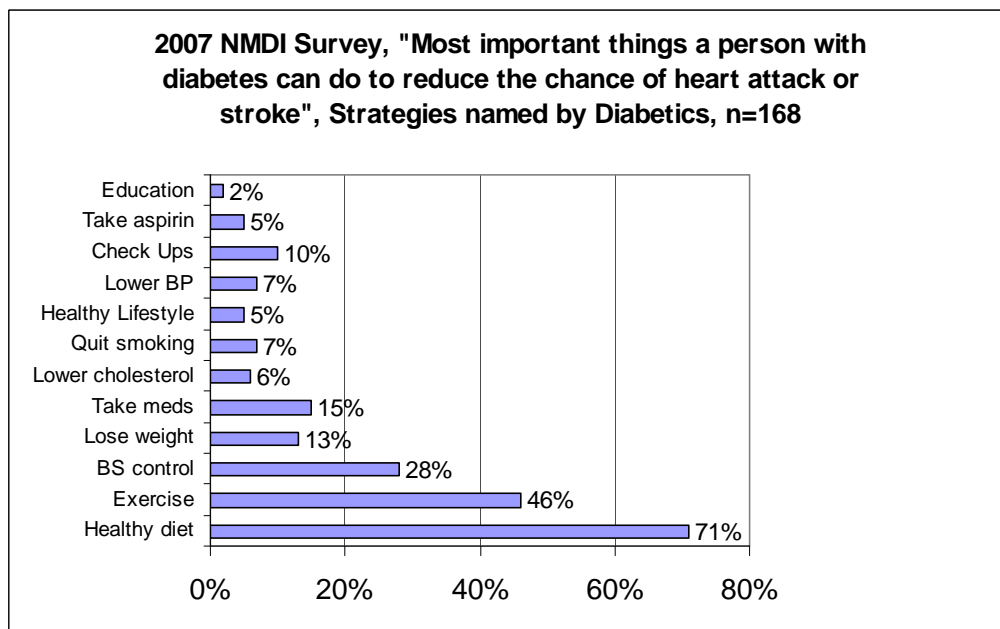
People with diabetes have high rates of risk factors that further jeopardize their health generally, and put them at increased risk for cardio vascular disease in particular. The majority of people with diabetes reported obesity or overweight (79%, with 51% reporting obesity and 28% reporting overweight) and a history of hypertension (72%) and high cholesterol (56%). These rates are significantly higher among people with diabetes than among non-diabetic people.



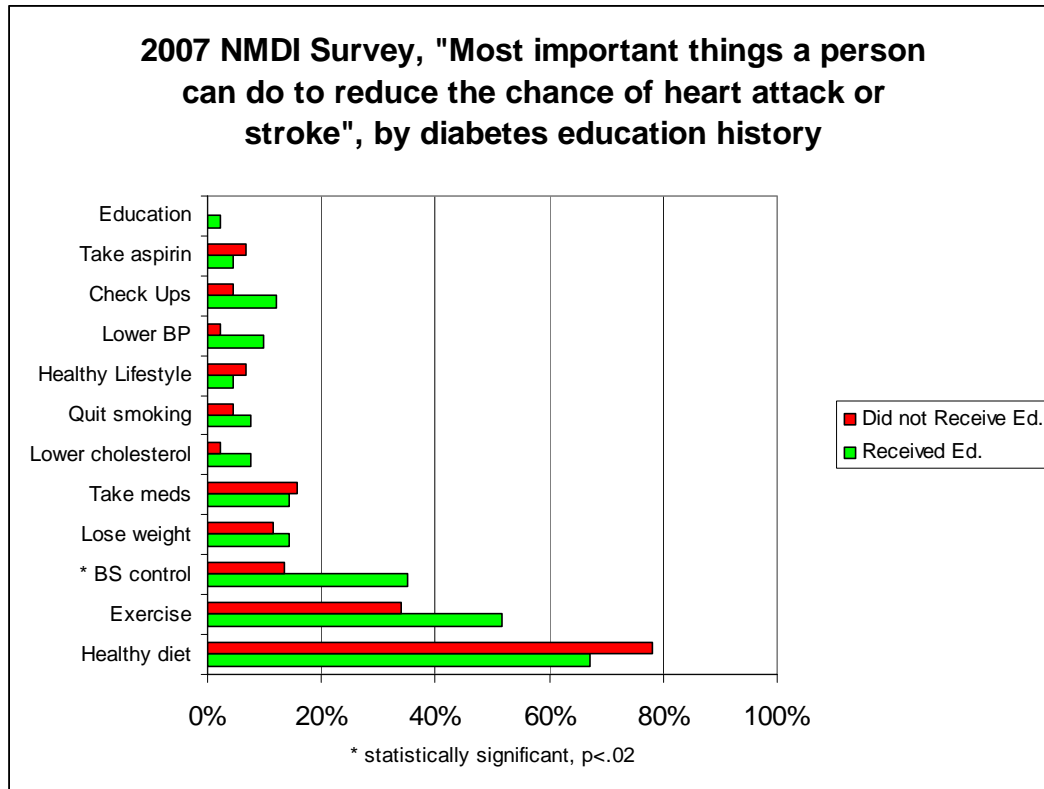
In order to explore awareness of effective strategies to manage diabetes, respondents were read a list of possible strategies for lowering blood sugar. When read a list, there was high recognition of effective diabetes management recommendations. Although it is not recognized as an effective strategy to lower blood sugar, 30% of respondents agreed that a low salt diet would “definitely help”, suggesting a certain level of confusion about dietary recommendations among the diabetic public.



Respondents were asked a similar question about reducing the risk of cardio vascular disease, “What are the most important things a person with diabetes can do to reduce the chance of having a heart attack or stroke”. Instead of being read a list, the question was open ended. Responses were grouped into categories. In general, except for “healthy diet”, there was much lower recollection of effective strategies when asked in an open ended manner than when read a list. While a high percentage of people with diabetes reported a healthier or better diet (71%), results suggest low awareness and recognition of other key diabetes management strategies including losing weight (13%), taking medication (15%), and lowering cholesterol (6%); and moderate recognition of the importance of blood sugar control (28%) and exercise (46%).



Having received diabetes education seems to improve the ability to name effective risk reduction strategies. People who report having ever received diabetes education had higher rates of naming specific strategies for lowering the risk of cardio vascular disease, compared to those who did not report a history of diabetes education. For the percentage who were able to name blood sugar control as an effective strategy, this difference was statistically significant using a Chi-square analysis.

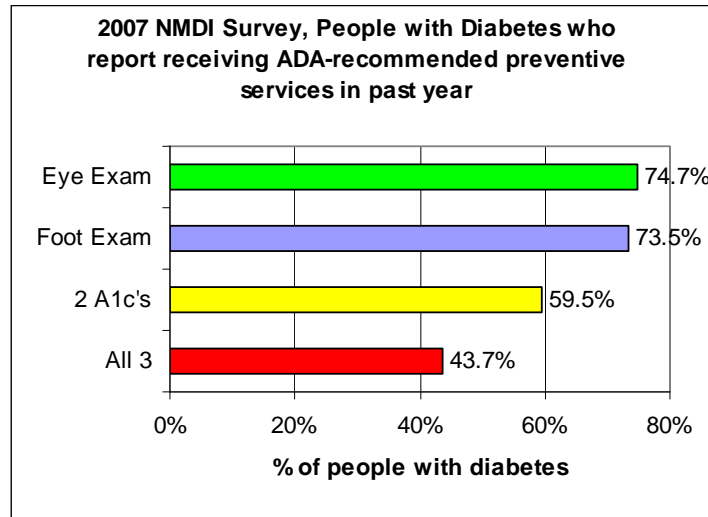


Diabetes Preventive Care Measures and Awareness of Care Recommendations Among People with Diabetes

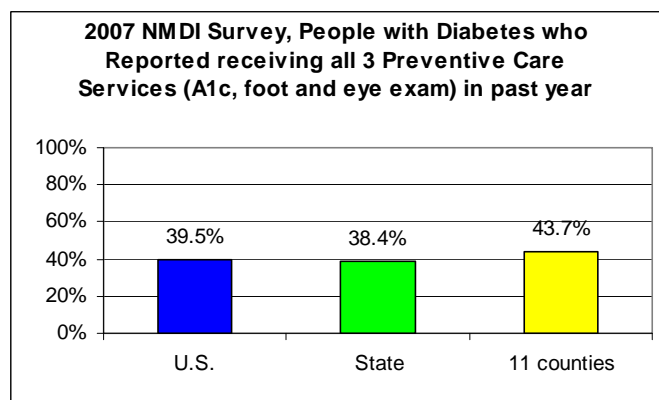
ADA guidelines affirm the benefit of a wide range of medical, psychosocial and educational services for people with diabetes. Official ADA treatment plan recommendations include ten “core” preventive care services. The following should be monitored regularly: hemoglobin A1c (every 3-6 months), blood pressure (every visit), cholesterol (annually), nephropathy (annually), weight (every visit), foot exam (annually), neuropathy (annually), thyroid stimulating hormone (annually), retinal (dilated) eye exam (annually), and immunizations (annually). In order to keep the survey a manageable length, three of these ten services, sometimes considered the “primary” preventive care services, were chosen to explore with the survey. Recently, State and federal population level data has become available on A1c monitoring, foot and eye exam, so these three were used in the survey in order to facilitate comparative analyses. For each of the three services, respondents were asked 1) if they had received the service

in the last year; 2) if they were aware they needed that service; and 3) if they had not received the service, what were the main reasons why not.

Analysis by individual service type revealed fairly high rates of receipt of service (60%-75%). The ADA guideline for hemoglobin A1c testing (at least 2 per year) had the lowest compliance. The majority of people received at least one of the three services included in the survey. However, fewer than half of all people with diabetes received all three, suggesting that the majority of people with diabetes are not receiving the comprehensive care recommended by ADA.

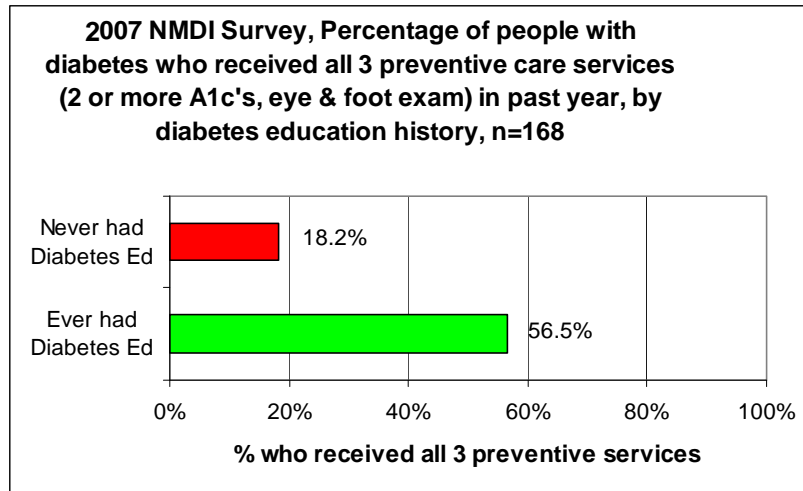


The 11 county rate found by the survey, although low, is still slightly better than State and national rates for receipt of all three primary ADA-recommended preventive services in the past year:

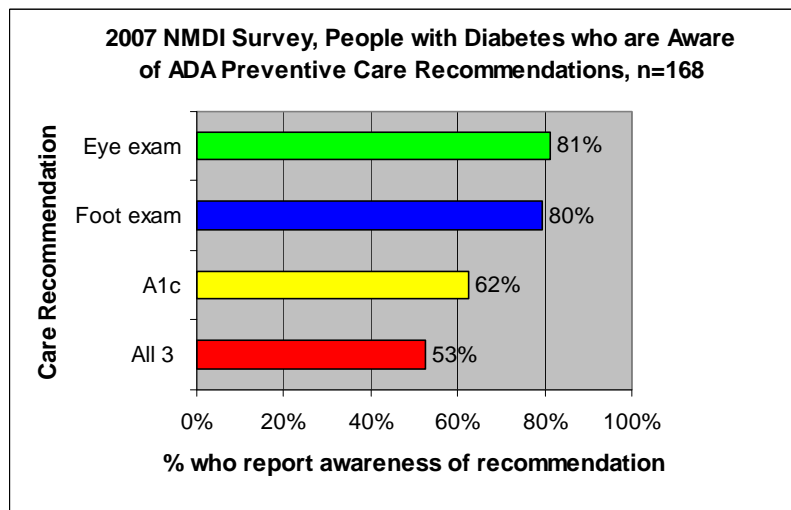


People with diabetes who reported not receiving a preventive care service were asked to name the main reasons for not receiving the service. Reasons given varied somewhat by service. Overall, however, the leading reason given for non-receipt of services was concern about insurance coverage or cost. “Don’t feel I need it”, being unaware of the need, and providers not ordering the services were the other most frequently mentioned.

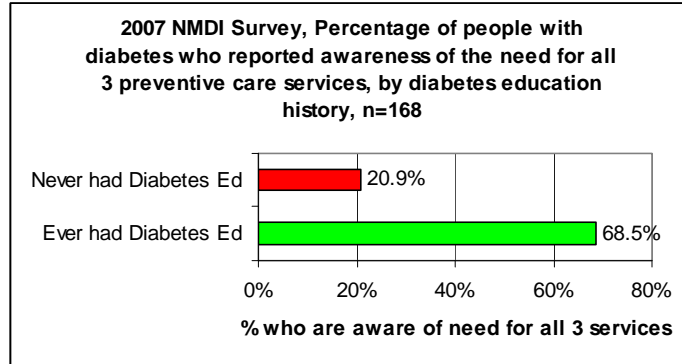
Receipt of all three preventive care services was analyzed by history of diabetes education and yielded significant results. People with diabetes who had ever received diabetes education were more than three times more likely to have received all three preventive care services in the past year than people without a history of education. This difference was highly statistically significant.



When asked about awareness of the need for specific services, a similar pattern emerged. While there were high awareness levels for the three services individually, only slightly more than half of people with diabetes were aware that they needed all three primary ADA-recommended preventive care services.

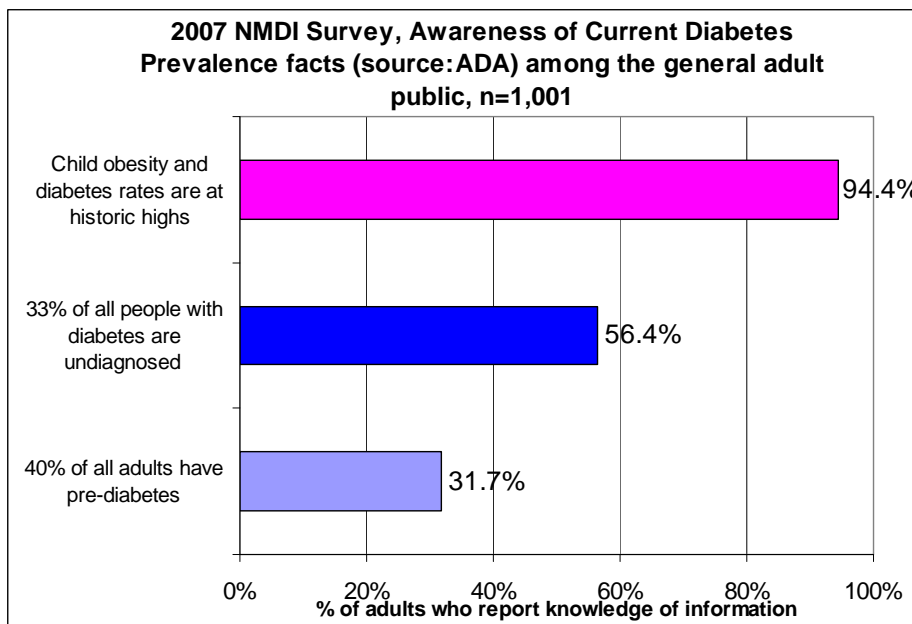


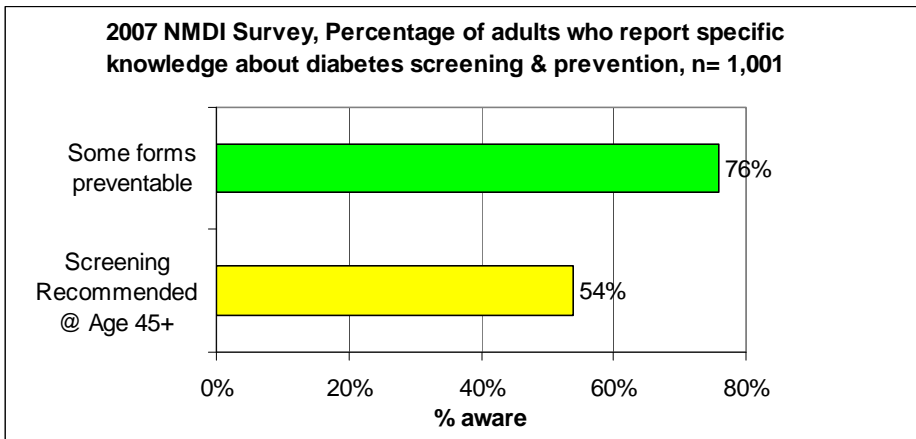
As was the case for receipt of preventive services, awareness of the need for all three services was highly associated with having ever received diabetes education. People who had a history of diabetes education were more than three times more likely to be aware of the need for all three preventive services included in the survey:



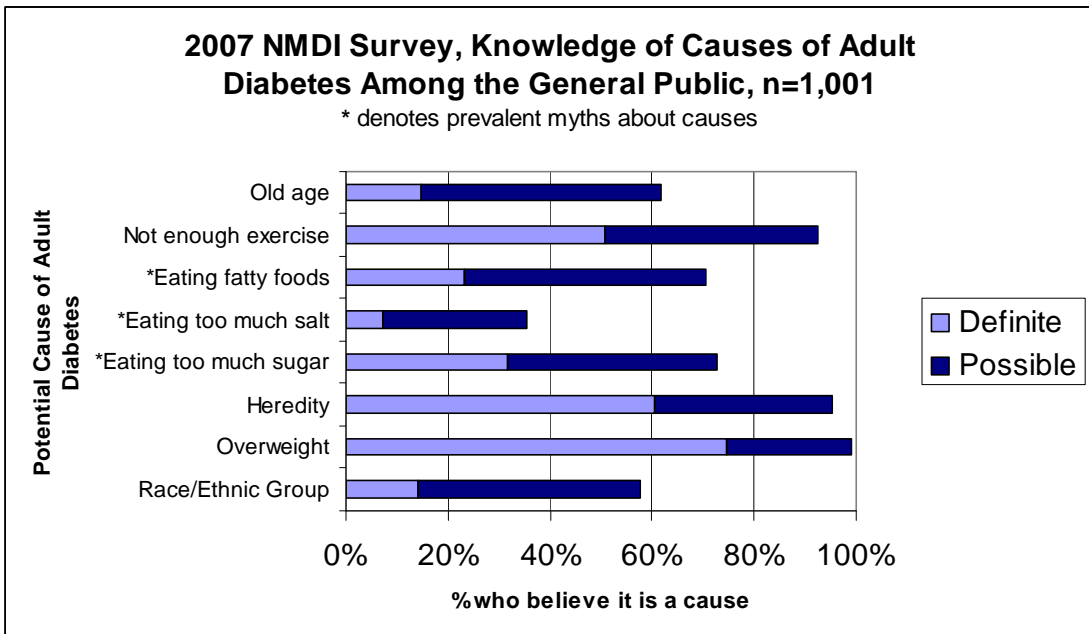
General Population Knowledge of Key Facts about Diabetes

A number of questions included in the survey sought to explore the general adult population’s knowledge of key facts about diabetes in order to identify public education needs. Respondents were asked if they were aware of several facts that have had wide national, regional, and in some cases local news coverage related to the magnitude of diabetes in the U.S. population. There was very high awareness of the historically high rates of childhood obesity and diabetes (94%), and lower awareness that 40% of all adults are estimated to have pre-diabetes. Parents of children younger than 18 years did not differ significantly from the general adult public in awareness levels. Results are presented in the chart below:

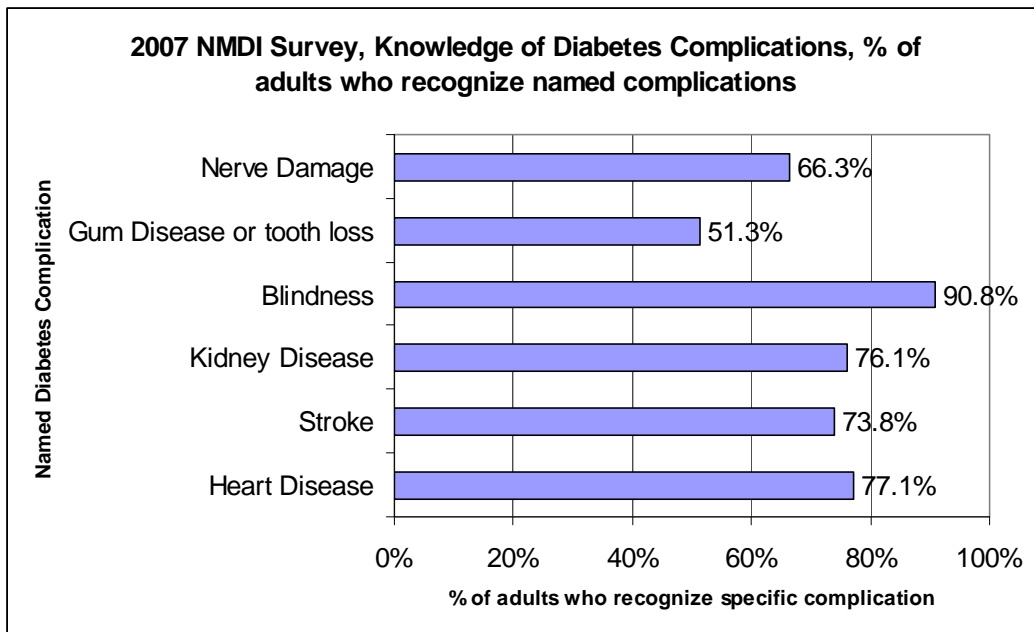
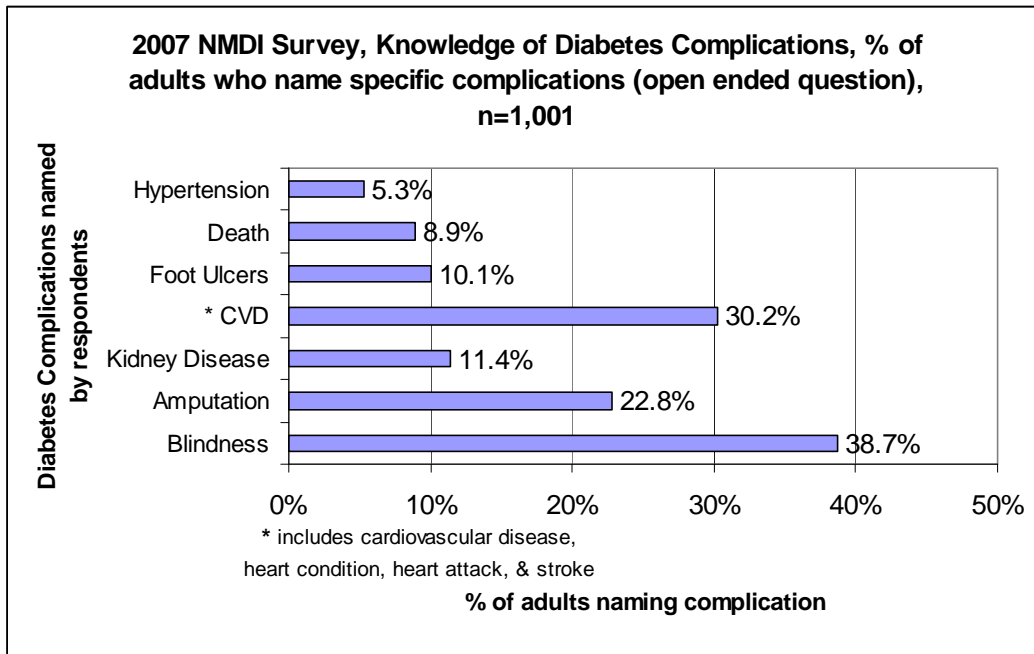




A list of known causes, or risk factors for diabetes, as well several prevalent myths about dietary causes was read to respondents who replied whether they felt it was a definite, possible or not a cause of diabetes. There was generally high recognition of all the leading risk factors for diabetes, other than age and race. About 14% cited both age and race as “definite” causes of diabetes, which was similar to national NDEP survey results (11%). Eating fatty foods and ‘too much sugar’ were frequently cited as causes of diabetes, despite the fact that they are not independent causes, highlighting a need for public education. While being overweight as a result of taking in too many calories from any source is a true risk factor, high dietary intake of sugar, salt or fat in and of themselves are not known to cause diabetes.



Respondents were asked two separate questions about complications and serious health problems that can be caused by diabetes. One question was open ended and designed to identify complications which are foremost in the public's mind. The other question involved reading a list of known potential diabetes complications to assess the degree to which each is recognized by the public. Both sets of results suggest low to moderate awareness and recognition of the most common complications.



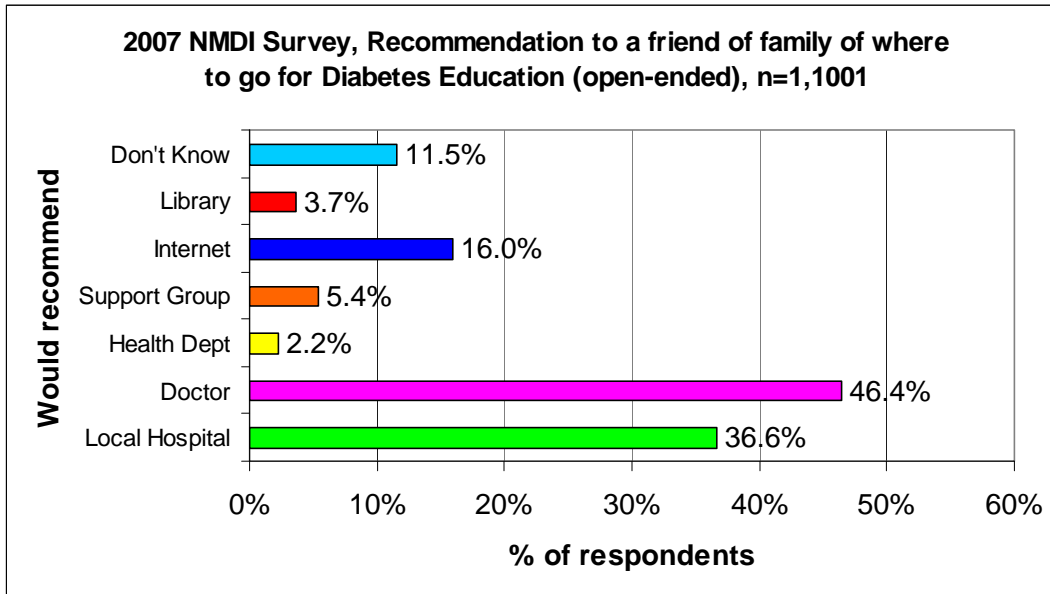
General Population Awareness & Attitudes related to Diabetes

Respondents were asked to rate how serious they consider diabetes to be. A follow up question asked how serious they thought it would be if someone their own age were to have diabetes. Nearly all respondents rated diabetes as “very serious” (82%) or “somewhat serious” (16.1%), which was similar to results from the national NDEP survey which found that 89% of adults rate diabetes as serious in general. There were not significant differences by age group, except for the 18-24 year olds who were significantly less likely to rate diabetes both in general, and within their own age group as very serious.

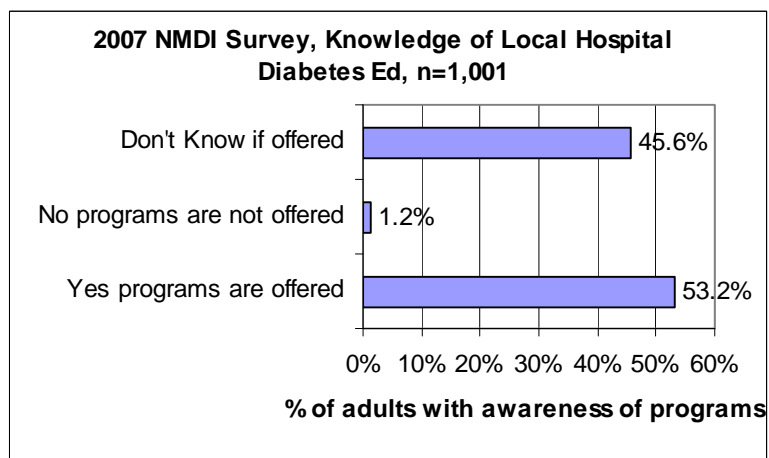
Percentage of Adults rating Diabetes as “Very Serious” by Age Group

Age Group	Diabetes in General	Diabetes within own age group
18-24	40.7%	43.5%
25-34	83.4%	72.4%
35-44	88.0%	78.4%
45-54	88.3%	81.0%
55-59	94.1%	87.0%
60-64	87.3	82.5%
65+	85.4	83.1%
NDEP national survey age 45+	89%	80%

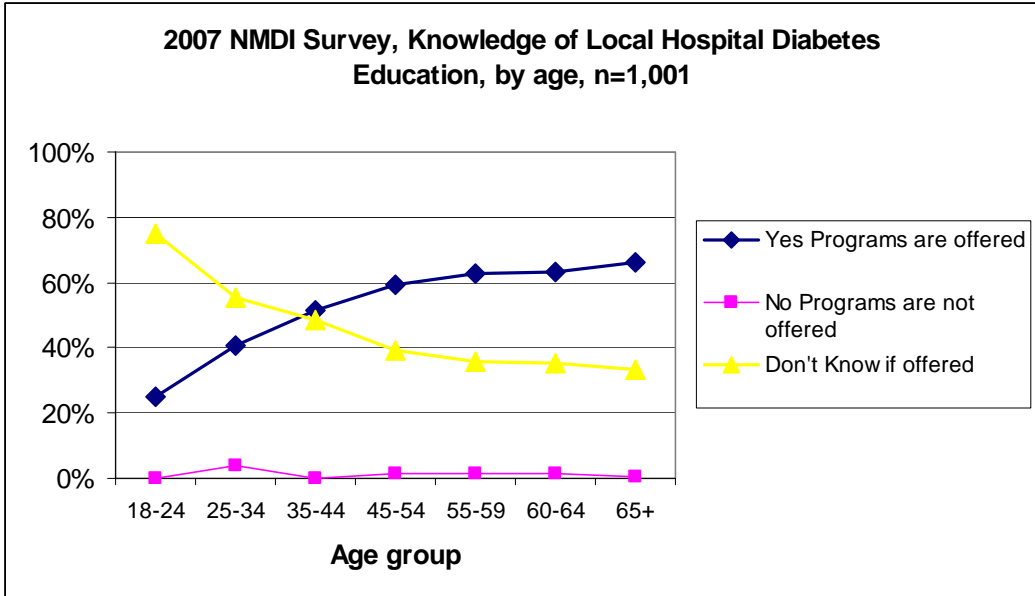
A primary aim of the NMDI is to increase public awareness of resources for people with diabetes in order to engage the community in improved diabetes management. Diabetes education programs are a key resource for and connection to the community. The survey provided an opportunity to collect baseline data on awareness of local diabetes education programs. An open-ended question asked respondents if a friend or family member were newly diagnosed, where they would recommend they go for education. Responses were grouped into distinct categories. Results suggest that doctors come to mind most frequently (46.4%) when thinking of sources for diabetes education. Certainly many people think of their health care provider as a “starting place” for health matters, highlighting the key role that providers can play in increasing awareness about diabetes education. A local hospital was the second most frequent (36.6%) answer. The frequency of each response category is presented in the chart below:



A second question asked if respondents specifically knew if their local hospital offered diabetes education. In general, there was only moderate knowledge of local programs (overall, 46% did not know if their local hospital offered programs). Results are presented below:

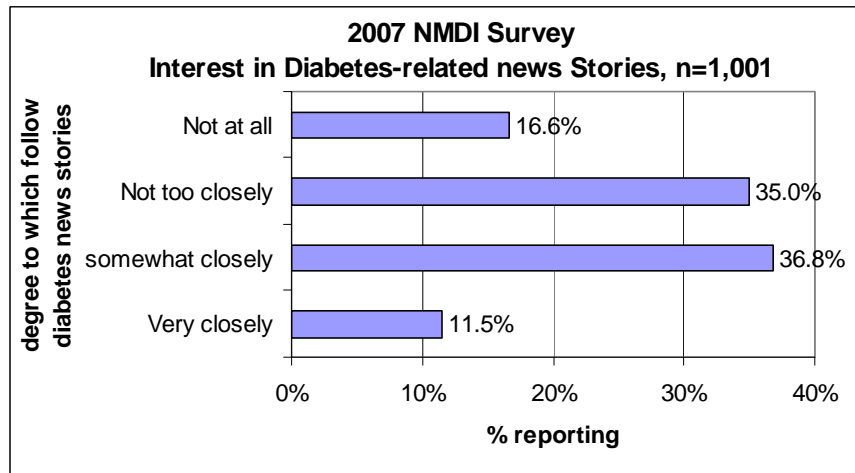


Awareness of local programs was significantly correlated with age, with older groups having greater awareness of programs. Only 24.8% of 18-24 year olds were aware if their local hospital offered diabetes education programs while 66.5% of those over the age of 65 years had awareness. Not having knowledge of local hospital education programs (response category “Don’t know if programs are offered”) went down with age, while knowledge of local programs (response category “Yes, programs are offered”) rose with age. These trends are displayed on the graph below:



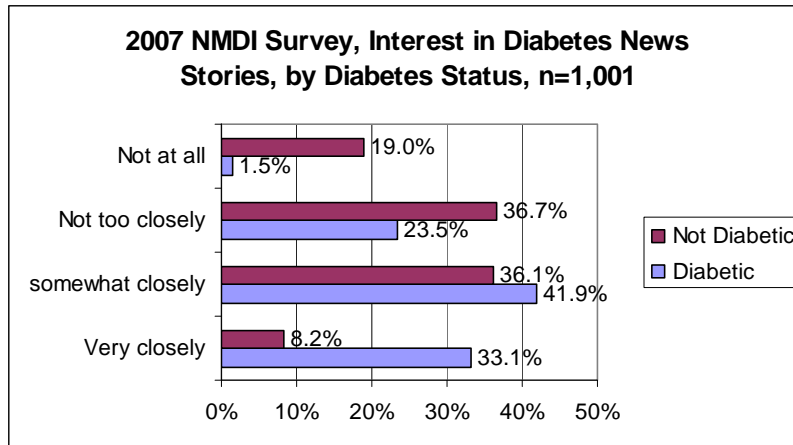
Interest in Diabetes and Sources for Health Information

To gage the general level of interest in diabetes, respondents were asked how closely they follow news stories about diabetes. Overall, 48.3% of respondents reported that they follow new stories about diabetes very closely (11.5%) or somewhat closely (36.8%). Responses were significantly correlated with age, with only 13% of 18-24 year olds reporting that they follow diabetes news stories somewhat or very closely; while 61% of those age 65 and older did so.

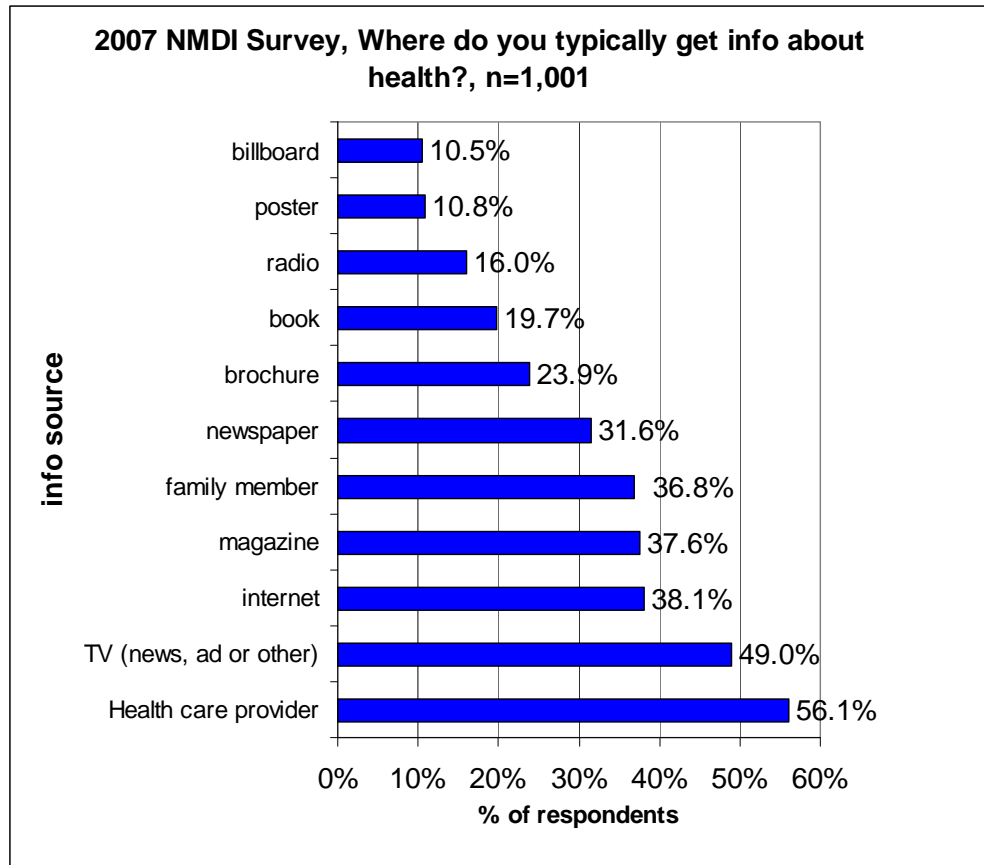


Interest in diabetes-related news stories was significantly correlated with a diabetes diagnosis. Three quarters (75%) of people with diabetes reported following diabetes-

related news stories somewhat or very closely, suggesting that news stories may be an effective outlet and strategy for getting educational messages to this population. Conversely, among people without diagnosed diabetes, the majority (56%) reported that they do not follow diabetes news stories at all or “not too closely”. Information targeted for this group (for example information about pre-diabetes and primary prevention) may be best delivered through an additional or alternative source to news outlets.



In order to explore what kinds of specific media outlets might be most effective at reaching the public with diabetes-related information, the survey included an item about sources for health information. Respondents indicated whether or not they typically received health information from a list of 13 potential sources. For analysis, TV news, TV commercials, and other TV were collapsed into one response category “TV”. Overall, the most frequently reported sources for health information were health care providers (56.1%), TV (49%), the internet (38.1%), magazines (37.6%), and a family member (36.8%).



The ranking of health information sources varied somewhat by age group, with the internet having the most significant difference by age. The most frequently cited sources of health care information for every age group were Health care provider, TV and Family members. In addition, the internet was in the top three sources cited for the younger age groups (through age 54), while older age groups cited magazines more frequently. The top three sources of health information by age group are presented below:

Age Group	Top Three Sources of Health Information
18-24 years	Family members, Internet, TV
25-34	Health care provider, Internet, Family members
35-44	TV, Health care provider, Family members
45-54	Health care provider, TV, Internet
55-59	TV, Health care provider, Magazines
60-64	Health care provider, TV, Magazines
65+	Health care provider, TV, Magazines
All Ages	Health care provider, TV, Internet

Interpretation and Translation of Key Findings into Guidance for the NMDI

Key findings and their significance to on-going planning efforts of the Initiative are presented below in four categories:

1) Understanding the significance of high diabetes prevalence in the region relative to other geographic areas of the State

Survey results show that prevalence is high, and that probably due to the concentration of older age groups in the area, it will remain a pocket within the State with a higher than average number of people with diabetes. This high prevalence coupled with the increased awareness that the Initiative is trying to build is likely to result in increased demand for services. The very high combined prevalence (42%) of adults already diagnosed with pre-diabetes or diabetes and undiagnosed but at high risk according to ADA risk criteria signals the need for a broad based educational effort. Diabetes now affects the majority of families in the region, and almost one out of every three people over the age of 65. Given the magnitude of diabetes and risk factors for it within the 11 county population, the Initiative may consider spearheading efforts to assess and advocate for adequate diabetes-related capacity within education and clinical care programs, particularly with regard to the needs of people age 65 years and older.

2) Areas of focus for improving preventive care for people with diabetes

Large and statistically significant differences were found between people with diabetes who did and did not report having ever received diabetes education. People who had ever received diabetes education were much more likely to be aware of the need for all three ADA recommended preventive care services, were much more likely to have actually received preventive care services in the past year, and were more aware of effective strategies for preventing cardio-vascular disease. This finding affirms the effectiveness of diabetes education programs in the 11 county area, and suggests a critical role for improving access to and use of diabetes education as a key strategy in pursuing the care improvement goals of the Initiative.

Among the three preventive care services studied, obtaining at least 2 A1c's in a year appears to have the most compliance challenges. The percentage of people who received at least one A1c in the past year was similar to the percentage who received eye and foot exams. Providing tools and support to practices to assist them with closer tracking, and patient reminder systems, in addition to increased patient education, are promising strategies for improving the number of people who receive at least a second A1c tests in a 12 month period.

Finally, patients cite concerns about affordability and insurance coverage for preventive care services as the leading reason for not obtaining them. Patient

education efforts should address these concerns by clarifying coverage terms for diabetes preventive care services for the major third party payers in the region, especially Medicare.

3) Public education needs and key messages to include in outreach and media campaign content:

Survey results show a need for better recognition of “Pre-diabetes”. Survey findings include a low percentage of at risk people reporting familiarity with the term “pre-diabetes” (56.8%). Primary prevention efforts which target those in the population who are at the highest risk for developing pre-diabetes and diabetes are likely to yield the most immediate positive results. Building a basic recognition and awareness of pre-diabetes may be a critical first step needed to better engage the community and health care providers in taking advantage of the enormous, and largely untapped primary prevention opportunities related to diabetes. A diagnosis of pre-diabetes should trigger intensive education and support geared toward actively engaging the patient in lifestyle changes.

The majority (62%) of people who are actually at elevated risk for diabetes (based on the ADA Risk Test) do not personally feel they are at risk. These and other survey findings indicate a need for improved public knowledge and recognition of actual leading risk factors for diabetes, particularly age and being overweight as the primary risk factors or causes. Educational messages should also address myths about dietary intake of sugar, salt and fat as independent causes of diabetes.

The survey data suggests that blood sugar screening rates and compliance with ADA screening recommendations are high - (75% of those age 45 years and older reported receiving blood sugar screening in the last three years). Because these data are based on self report, and the accuracy of patient recall of specific lab tests is unknown, the Initiative should explore options for verifying these screening rates through the use of available clinical data systems including patient registries and lab order systems.

There was generally high recognition of a healthy diet and exercise being protective against cardio vascular disease. However, the public does not seem to make the same immediate connection between cardiovascular risk and blood sugar control. Educational campaigns such as NDEP’s “Know your numbers” may offer effective strategies for improving public understanding of blood sugar.

4) Information outlets for public information campaign:

Results indicate that doctors and other health care providers come to mind most often as sources to go to for health information generally and diabetes education

specifically. This survey finding suggests that the Initiative should build on the public's reliance on health care providers as "starting places" for health information. The Initiative should equip providers with the information and tools necessary to facilitate and encourage patients to access the kinds of educational support that is beyond the clinical instruction available in their practice. Because participation in formal diabetes education is so highly associated with improved awareness and increased receipt of preventive care, providers should be encouraged to do whatever they can to assure that all diabetic patients have access to diabetes education programs.

Because among people with diabetes there is high interest in news stories about diabetes, news may be an effective outlet and strategy for getting educational messages to people with diabetes. However, among people without diagnosed diabetes, 56% reported following diabetes news stories not too closely or not at all, suggesting that non-news formats may be more effective delivering pre-diabetes and prevention messages.

The Initiative has planned both community based and media based educational campaigns. Data about preferred sources for health information suggest that TV, the internet and magazines may be the most effective conventional media methods for getting information and educational messages about diabetes to the public. Survey results also indicate that health care providers and family members are critically important sources of health information as well. Community based outreach will be needed in order to engage these entities and mobilize them as sources of public education. Examples of possible outreach points include church, civic, school, employer and recreational community groups.

Appendices

Appendix 1 List of Survey Development Committee Members

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Eileen Mikus, BSN, CDE, Otsego Memorial Hospital
Deb Sears, Munson Healthcare Corporate Communications
Julie Shippy, Executive Director, TIPDON

Appendix 2 Survey Tool

Appendix 3 ADA Risk Test