



**Northwestern  
Michigan  
College**

**Report to**

**MUNSON HEALTHCARE  
Northern Michigan Diabetes Initiative**

**For**

**2012 Regional Diabetes Survey**

**Prepared by:**

***Research Services - NMC***

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**Northern Michigan Diabetes Initiative (NMDI)  
2012 Regional Diabetes Survey**

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## I. EXECUTIVE SUMMARY

***Introduction and Objective:*** The Northern Michigan Diabetes Initiative (NMDI) is a collaborative community based effort designed to reduce the prevalence of diabetes and also improve the care of people with diabetes. Key partners include Munson Healthcare (a seven-hospital regional health system), Priority Health (a non-profit insurance provider), regional health care providers/practices, and local public health departments.

Research was conducted in 2007 via a telephone survey targeting adults 18 and over in the 11-county primary service area of the Munson Healthcare System; in 2012 this survey was replicated in the same region. The purpose of the research is to learn more about the prevalence of diabetes and risk factors, as well as to identify gaps in diabetes care and public knowledge in order to guide and inform project efforts. By completing this survey for a second time, the Northern Michigan Diabetes Initiative is able to compare 2012 survey results to 2007 baseline results, thus assessing the impact of NMDI activities and efforts.

***Methodology:*** The original survey instrument, as developed in 2007 with the approval and backing of the NMDI Steering Committee, was modified slightly in 2012 to measure impact of specific activities initiated in the past five years. 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 study targeted a sample size of 1,000 respondents; a total of 1,001 interviews was completed. Northwestern Michigan College-Research Services (NMC-RS) was contracted to obtain the sample, implement the survey, and prepare the final report. Data analysis was performed by Lori Corteville, Data and Evaluation Consultant.

***Key Findings:*** Almost one-third (32.1%) of survey respondents reported having been diagnosed with diabetes or pre-diabetes, signifying the magnitude of this public health issue. Survey results indicate the regional prevalence estimate for pre-diabetes is 16.9%, while the prevalence estimate for diabetes is 15.2%. In comparison to the 2006 state average of 9.0% and 2006 U.S. national median of 7.5%, the regional diabetes estimate of 15.2% is significantly higher. Similarly, the noted estimates are higher than other estimates for the region, though the current research is believed to be more accurate due to the larger sample size and sampling design.

Probable explanations for this disparity include the concentration of older people in the 11-county regional population and a higher incidence of risk factors, most notably obesity. The consideration of other survey results suggest the higher prevalence estimates may also be due in part to a higher rate of testing and diagnosis rather than, or along with, higher actual disease incidence.

The very high combined prevalence of adults already diagnosed with pre-diabetes or diabetes (32.1%) and undiagnosed but at risk according to ADA risk criteria (35.1%) points to 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 approximately 67% of the adult population. Furthermore, only 36% of those respondents actually at elevated risk for diabetes reported that they personally feel at risk, identifying a significant gap in public perception. Family history was the most frequently cited reason for feeling at risk (77%), while being overweight (which actually increases risk more than family history) was cited by only 31%, further 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 respondents reporting they have diabetes also reported being obese or overweight (60% and 29%, respectively), hypertension (74%) and high cholesterol (64%). Relatively few respondents reporting a diabetes diagnosis were able to name key strategies for lowering cardio vascular risks, in particular blood sugar control, losing weight, taking medications, and controlling cholesterol (28%, 22%, 20%, and 6%, respectively).

While survey results indicate regional rates of ADA compliance are slightly better than at the state level (52% vs 42%, respectively), just over half of all respondents with diabetes reported they had received all three primary ADA-recommended preventive services (two A1cs tests, annual eye and foot exams). The leading reasons cited for not receiving the preventive services were unaware of need, cost and insurance coverage, and personally do not feel the need.

A significant finding of the survey was that respondents with diabetes who reported receiving diabetes education were twice as likely to be aware of the need for services, and more than one and half times as likely to have actually obtained all three primary ADA-recommended preventive care services. These findings highlight the importance of 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 (93% of respondents overall) that U.S. childhood obesity and diabetes rates are at an historic high. However, just over half of respondents (57%) reported they were aware of general diabetes screening recommendations and only 29% knew of the high prevalence of pre-diabetes. In addition, very few respondents (15%) 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 (54%), followed by local hospitals (29%). Less than half (48%) 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 (64%), TV (sources included News, Commercial, Health Shows and TV, other), (54%), and Internet/Facebook (45%).

The majority of survey respondents (67.7%) reported that either they themselves or an immediate family member have been diagnosed with diabetes, indicating 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.

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 physician offices, employer sites, health fairs and 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 (NMDI)**

The Northern Michigan Diabetes Initiative (NMDI) is a collaborative effort of Munson Healthcare (including seven affiliated hospitals), Priority Health (a non-profit insurance provider), 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 recent growth in the population of residents over the age of 65. Diabetes is a leading health care issue in the region. In 2011, the percent of inpatients with a diabetes diagnosis was 24% in our region, while in 2007 diabetes was 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 prevalence 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. The collaboration allows partners to work together to adopt consistent and clear messages and to develop common intervention strategies.

## **III. PROCESS AND METHODOLOGY**

In November of 2007 and again in April of 2012, the Northern Michigan Diabetes Initiative conducted a telephone survey of over 1,000 adults living in the 11-county Grand Traverse region of Northwest Michigan. The purpose of the study is 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 initially developed to provide a “baseline” profile for the 11 counties on key indicators the NMDI has targeted for 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 pre-diabetes, 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 provides a unique opportunity to better understand and document prevalent attitudes and gaps in basic knowledge about diabetes in the general public. Because the NMDI planned to implement public information and community education campaigns, the survey was designed in part to clarify what messages were most needed.

In development of the original 2007 survey instrument, a number of publicly available national and regional tools were reviewed in an effort to identify questions already validated with a general population. Using questions from existing tools has allowed for comparison of regional results to previous State and national findings. The following publicly available tools were reviewed and used in original 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/diabetes-basics/prevention/diabetes-risk-test/?loc=AlertDay](http://www.diabetes.org/diabetes-basics/prevention/diabetes-risk-test/?loc=AlertDay))
- Knowledge Test (DKT), Diabetes Care Profile (DCP), Michigan Diabetes Research and Training Center

The original survey instrument, as developed in 2007, was modified slightly to measure impact of specific activities initiated in the past five years. With approval to proceed from the Munson Healthcare Institutional Review Board, a committee of NMDI staff and research consultants led revision of the survey tool (see Appendix A for a list of survey committee members).

The 2012 survey instrument (See Appendix B) included a total of 76 items within five sections:

- Section A: Diabetes, pre-diabetes, and diabetes risk status (administered to all respondents)
- Section B: Receipt of preventive care and knowledge of recommendations among people with diabetes (administered only to people reporting a diabetes diagnosis)
- Section C: Knowledge of key messages and facts about diabetes (administered to all respondents)
- Section D: Public attitudes and education needs (administered to all respondents)
- Section E: Respondent demographic data (administered to all respondents)

### **Sample Design And Data Collection**

The study proposal included plans to obtain a sample of 1,000 adults, 18 and over, from the 11-county area; the final sample includes 1,001 completed surveys. NMC-RS purchased all Random Digit Dial (RDD) and wireless sample used in the research from Survey Sampling International (SSI), with the first sample purchased on March 29, 2012. The sample was generated with each county represented proportionate to the total 11-county target population (Antrim, Benzie, Crawford, Grand Traverse, Kalkaska, Leelanau, Manistee, Missaukee, Otsego, Roscommon, Wexford). The initial sample contained 11,600 records; after screening, a total of 7,490 records remained. Sample was pulled in replicates of 100 (strata), with 50 land and 50 wireless records per replicate. Beginning April 2, 2012, callers made a minimum of six attempts (two in the morning, two in the afternoon and two in the evening) on varying days to reach a number, exhausting all numbers before moving to the next "Rep."

After the original sample was exhausted, additional completed surveys were needed in nine counties to ensure adequate representation based on county population distributions. A second sample, consisting of landline records only, was purchased on May 3, 2012. This sample included 2,950 records, 1,309 after screening. The sample was pulled in replicates of 100 (strata). After this sample was exhausted, additional completed surveys were needed in five counties (Crawford, Leelanau, Manistee, Missaukee, Roscommon). On May 15, 2012 a third sample was purchased to complete surveys in these five counties. This sample included 1,518 landline records, 736 after screening and was pulled in replicates of 100 (strata). All numbers were called.

Sample detail:

3-29-12: 1<sup>st</sup> sample purchased, 11,600 – after screening of the landline numbers, a total of 7,490 records were available for calling (3,528 landline, and 4,100 wireless).

5-3-12: 2<sup>nd</sup> sample purchased, 2,950 landline numbers, after screening, a total of 1,309 records were available for calling.

5-15-12: 3<sup>rd</sup> sample purchased, 1,518 landline numbers, after screening, a total of 736 records were available for calling.

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



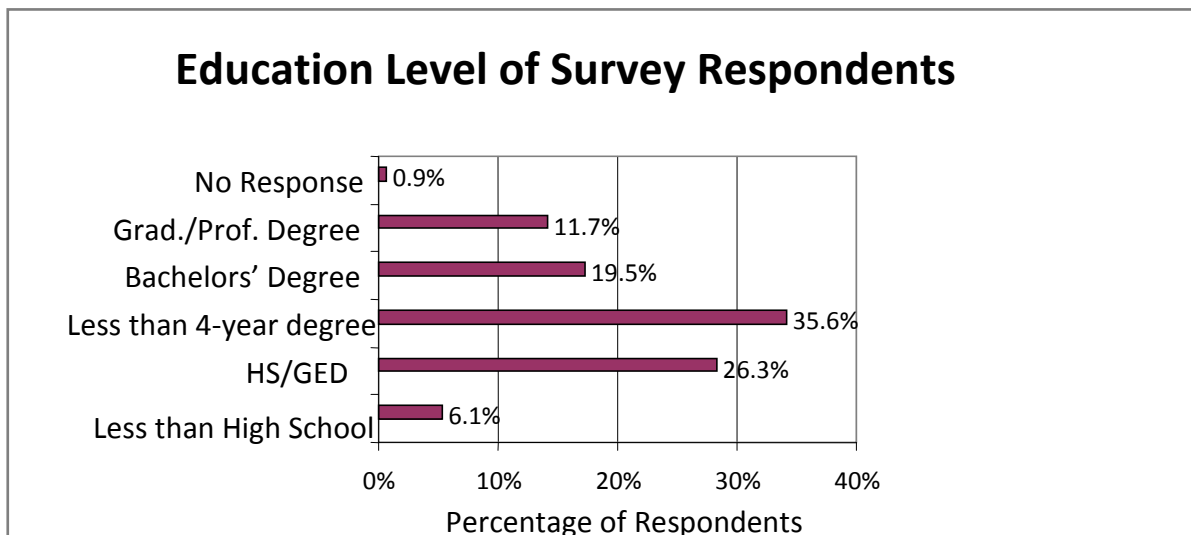
### **Sample Demographics**

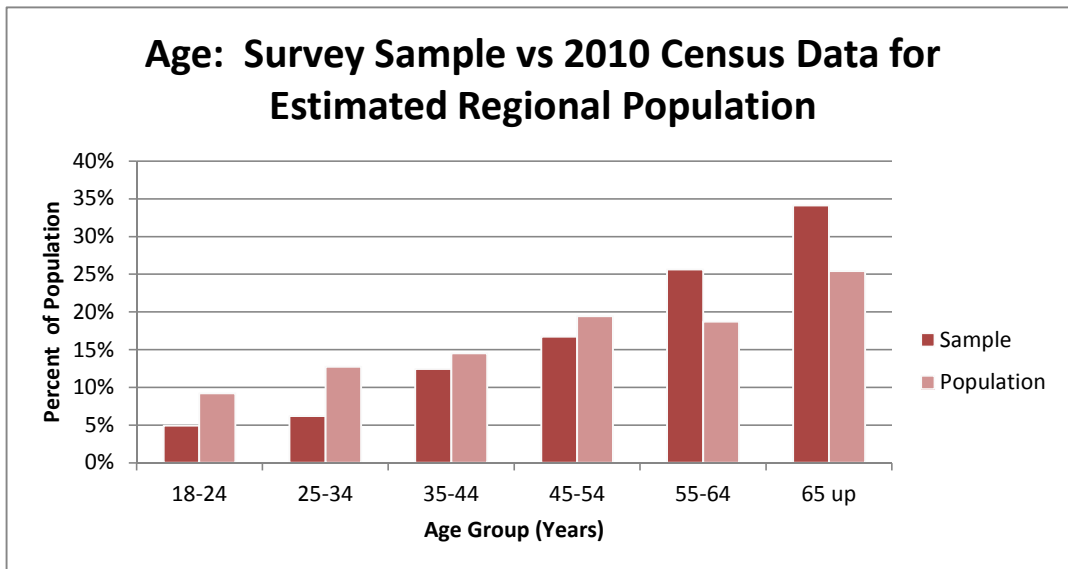
Preliminary frequency analyses with *unweighted* data were run by Research Services at Northwestern Michigan College; the total sample included 1,001 respondents. Of these, 750 were age 45 years or older, 163 (reported having been told they have diabetes, 238 have children in their household under the age of 18 years, and 108 reported no health care coverage.

Key characteristics of survey respondents:

- 67% female
- 77% over the age of 45 years;  
34% age 65 or older
- 96.6% White, 2.4% American Indian or Alaska Native, 1% Hispanic, .2% Black or African American, and 1.3% Multi (respondents could report more than one race)
- 24% with children under the age of 18 in their household
- 11% with no health care coverage (1.9% of those age <65 years; 26% age 35-44)
- 10% with Medicaid coverage (36% of those age <65 years)

The following charts highlight respondent variation in highest obtained education level and age distribution:





As shown here, when compared to 2010 census estimates, the sample was skewed toward respondents 55 and older; 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, data was 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 2010 National Center for Health Statistics (NCHS) bridged-race population estimates for the 11-county region.

The raw data were analyzed using the statistical software application Statistical Package for the Social Sciences (SPSS) and weighted data were analyzed using R. A series 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 subgroups when appropriate and presented where meaningful differences were found. Results were not analyzed at the county level as county sample sizes were not large enough to draw meaningful conclusions. Weighted survey results for the 11-county region were compared to findings from other state and national data sources where available.

Data sources used for comparative analyses include the 2010 Behavioral Risk Factor Surveillance (BRFS) results for Michigan and the 2008 National Diabetes Education Program survey, conducted with adults 35 and over.

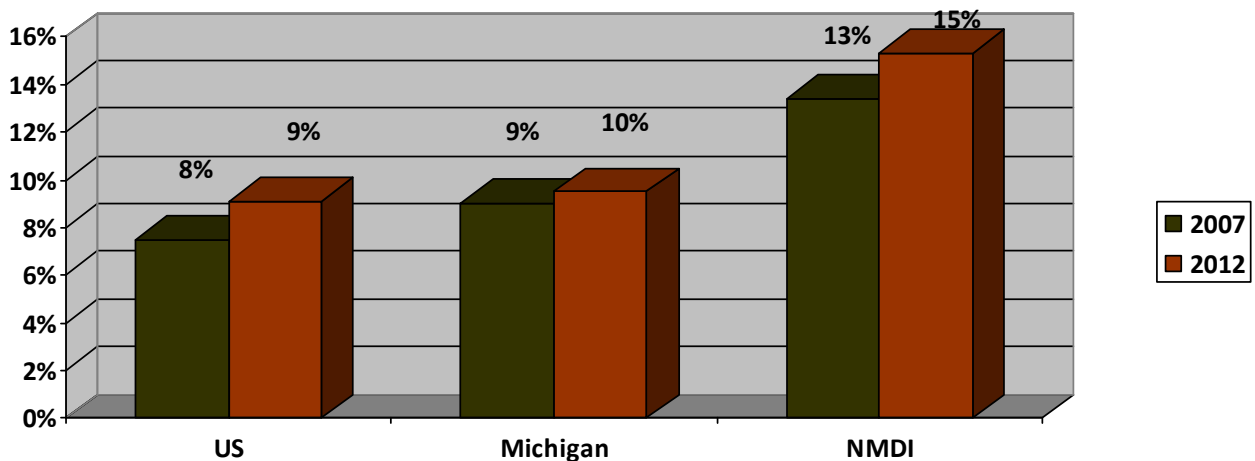
#### IV. SURVEY RESULTS

Survey results are grouped by major content area and presented below. Where relevant, findings are broken out by subgroup, with significant findings presented.

##### Diabetes Prevalence

Over two thirds of respondents (68%) reported that either they themselves or an immediate family member has been diagnosed with diabetes. Based on weighted survey results, 15.2% of adults in the 11-county region report having been diagnosed with diabetes; this is higher than the estimated statewide prevalence of 10% and U.S. rate of 9% (2006 BRFSS).

**Comparison of Regional, Statewide and National Diabetes Prevalence Estimates by Year**

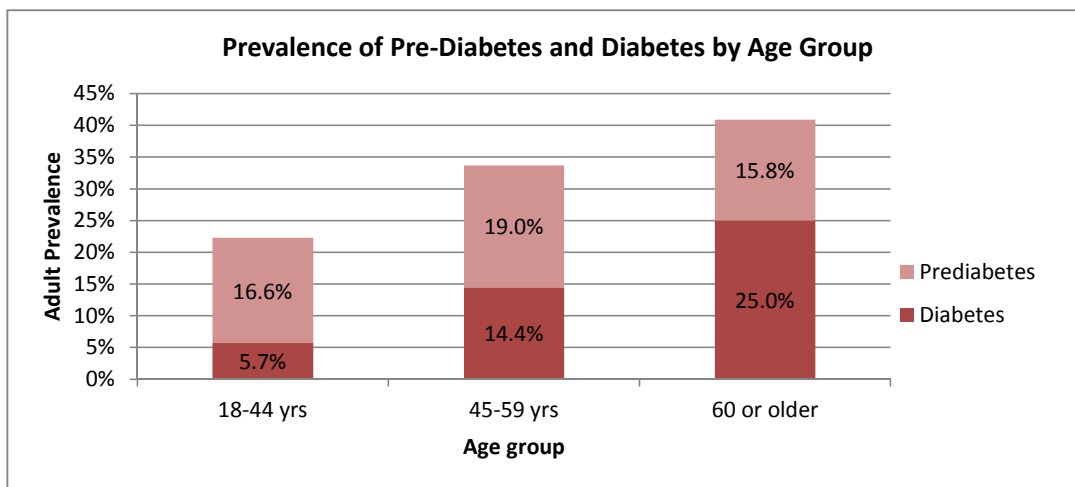


The NMDI diabetes prevalence estimate of 15.2% (95% CI 12.8%-17.7%) is also higher than the 2005 MDCH BRFSS estimate compiled for the same 11-county region (7.8%, 95%CI 5.4%-11.2%) and the 2006 MDCH BRFSS results for the 21 Northwest Michigan counties which include the 11-county survey region (9.5%, CI 7.0%-13.0%). While the NMDI confidence interval does slightly overlap the BRFSS interval, the NMDI survey estimate is clearly the highest and has the narrowest confidence interval. Of the three estimates, it is likely the NMDI is most accurate given the significantly larger sample size representing the region.

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 percent of overweight and obesity adults. Another factor could be higher rates of diagnosis 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.

In addition to being a more precise estimate of the true diabetes prevalence in the population, another factor accounting for a higher prevalence rate regionally, as indicated by the NMDI research, could be the actual increase in disease prevalence since 2005 (year of the MDCH BRFSS survey). Finally, the significant change in clinical practice since 2005, resulting in increased diagnosis rates rather than, or in addition to, a true increase in disease prevalence, may partially account for this finding.

As expected, and as highlighted below, there is a sharp increase in diabetes prevalence with age, with fully one-quarter of respondents 60 or older reporting a diabetes diagnosis. This observed increase with age is statistically significant. Furthermore, additional analyses indicate diabetes diagnosis significantly interacts with gender, with 18% of males and 12% of females reporting a diagnosis.



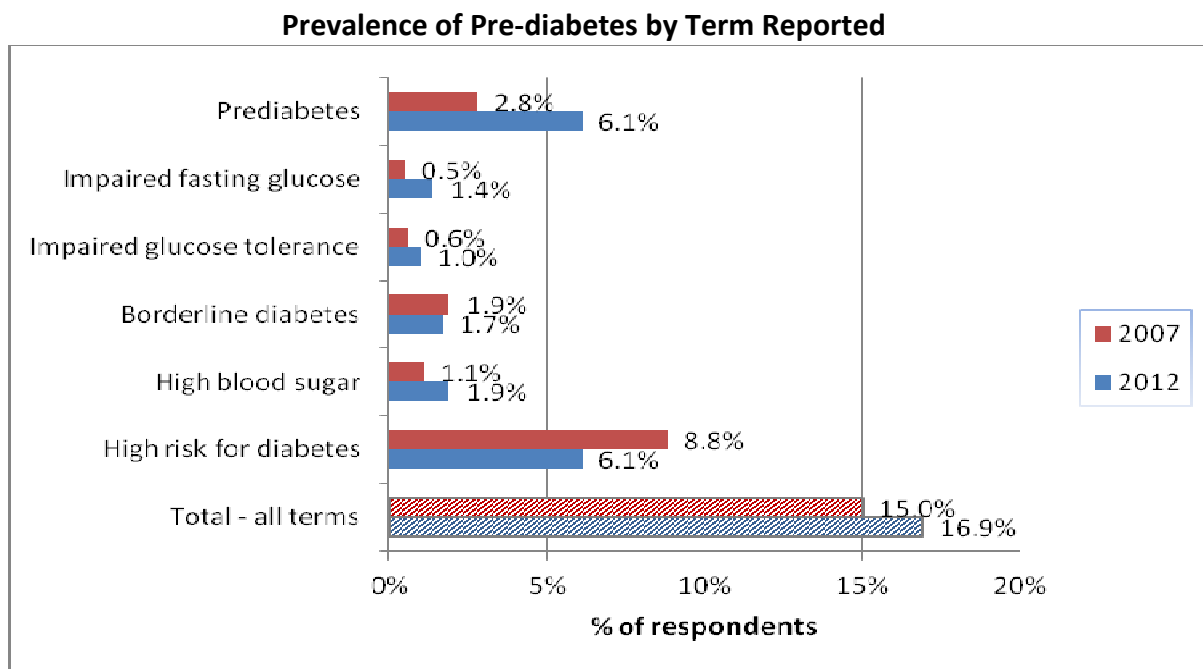
### **Pre-Diabetes Prevalence**

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 and 125 (higher than 125 is considered diabetes). A variety of medical terms are commonly used 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 pre-diabetes prevalence difficult.

With regard to the current research, respondents who had not already reported a diagnosis of diabetes were asked if a doctor/health care professional had ever told them that they had any of the above conditions. Based on input from currently practicing diabetes educators, and in order to estimate the prevalence of pre-diabetes in the population as closely as possible, the research committee chose to interpret a report of having been told by a health care provider that one is at high risk for diabetes as a diagnosis of pre-diabetes. In addition, having been

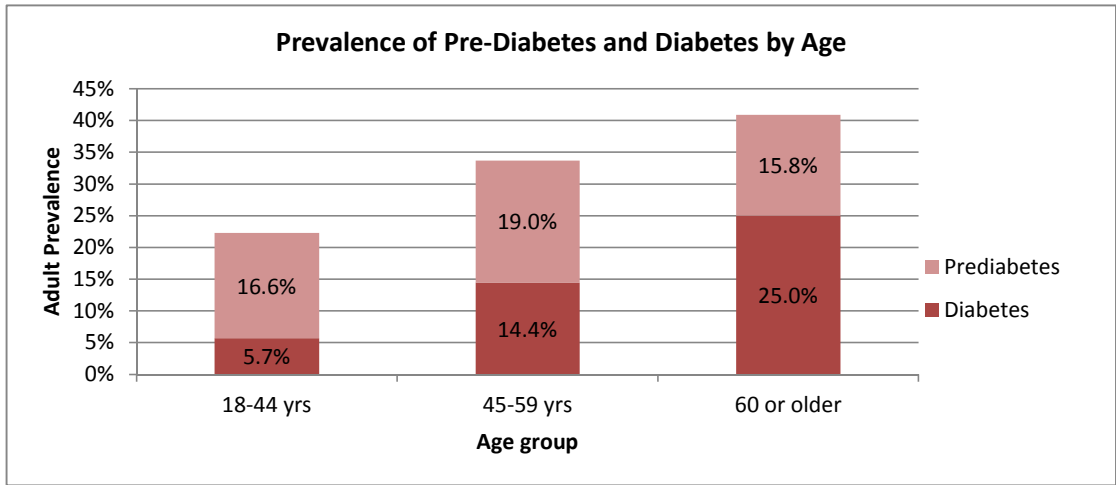
told that one has any of the other above mentioned conditions is interpreted as a diagnosis of pre-diabetes. It is notable, however, that respondents in 2012 were significantly more likely than in 2007 to report their doctor had used the term pre-diabetes with them (6.1% vs. 2.8%). These 2012 NMDI results are in line with the Michigan rate of 6.4%.

Among people without an established diabetes diagnosis, 17% 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 more similar to national estimates. The most commonly reported terms for a pre-diabetes diagnosis were “high risk for diabetes” (6%) and “pre-diabetes” (6%).



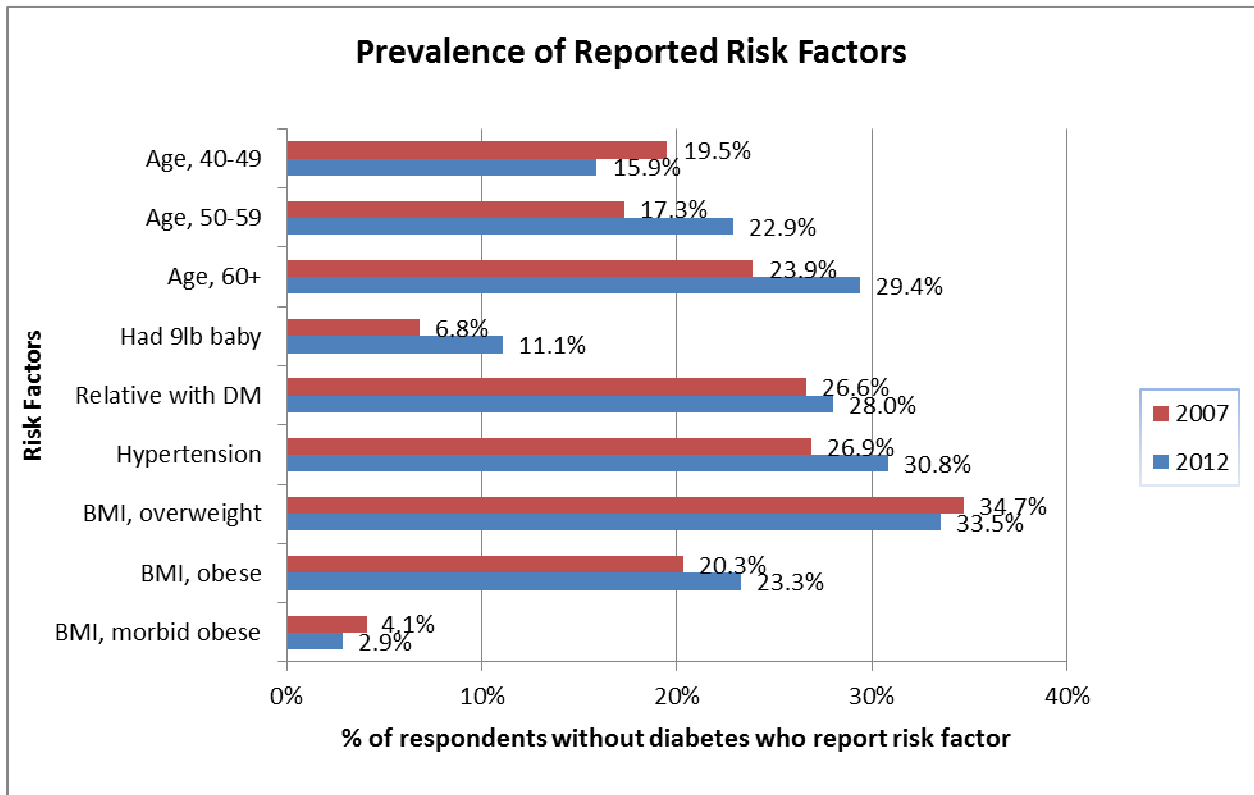
With regard to analysis of pre-diabetes prevalence by age, 17% of the 18 to 44 year olds and 19% of the 45 to 59 year olds reported having been told by a health care provider that they are at high risk for diabetes. Interestingly, prevalence rates seem to decrease after age 60 (see table below). This apparent decrease 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.

When the prevalence of diabetes and pre-diabetes is combined and charted by age, the expected trend of increased numbers of people affected by one or the other can be seen. Additional analysis highlights a statistically significant interaction in pre-diabetes diagnosis by gender (12% male vs. 22% female) and age. In addition, respondents were more likely to report their doctor had used the actual term “pre-diabetes” with them in 2012 than in 2007 (6.1% vs. 2.8%, respectively).

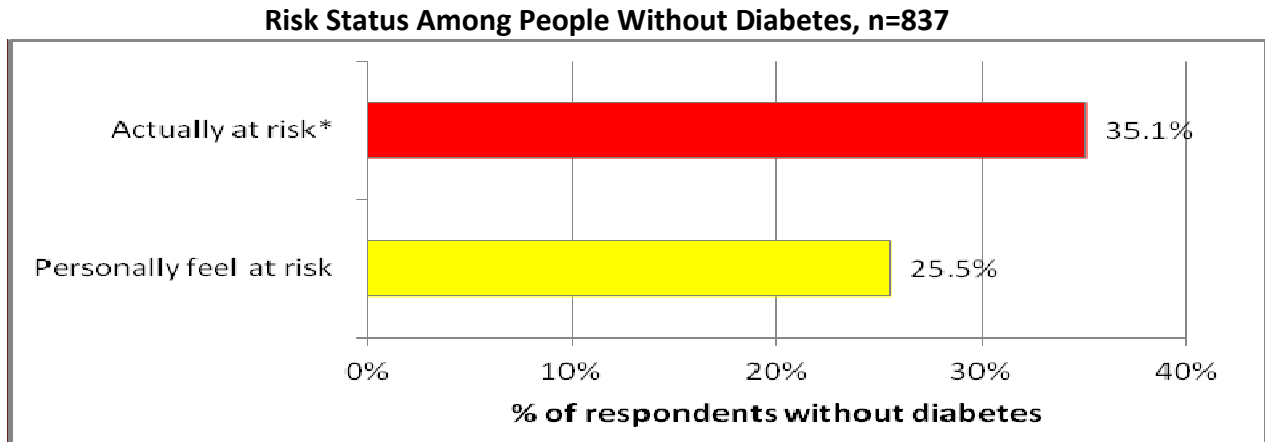


**Prevalence of Risk Factors for Diabetes Among Non-Diabetics**

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 (See Appendix C). The prevalence of reported risk factors is presented in the chart below. The most commonly reported risk factors, other than age, are high BMI/overweight, hypertension and a relative with diabetes.



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. At Risk respondents were identified as those with an ADA score of 5 or more. The following chart highlights the gap between respondents actually at risk and those that feel at risk.

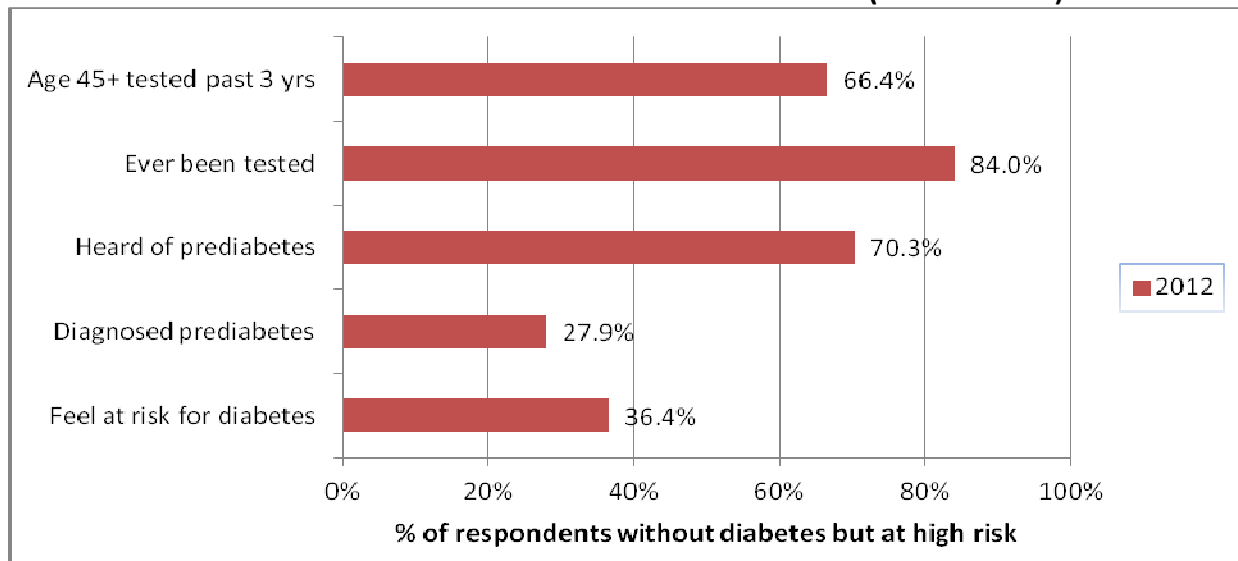


\*ADA Score 5+

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-diabetic respondents with an ADA risk score of five or more (elevated risk), only 36% reported that they personally feel at risk. However, this is approximately 10% more than the National Diabetes Education Program (NDEP) survey results, in which only 25% of at risk respondents reported feeling at risk for diabetes. In comparison, 29% of respondents identified as high risk (based on self reported height and weight) in the 2008 NDEP survey of people age 35 and older actually reported feeling at risk.

The ADA recommends that all people age 45 years and older have a fasting blood sugar test at least every three years. Survey results indicate that 85% of non-diabetic respondents age 45 years and older reported having had their blood sugar tested within the last three years; interestingly, of those respondents identified as high risk, only 66% reported being tested in the last three years. Other reported characteristics, also related to awareness, of non-diabetic people at elevated risk are presented in the chart below.

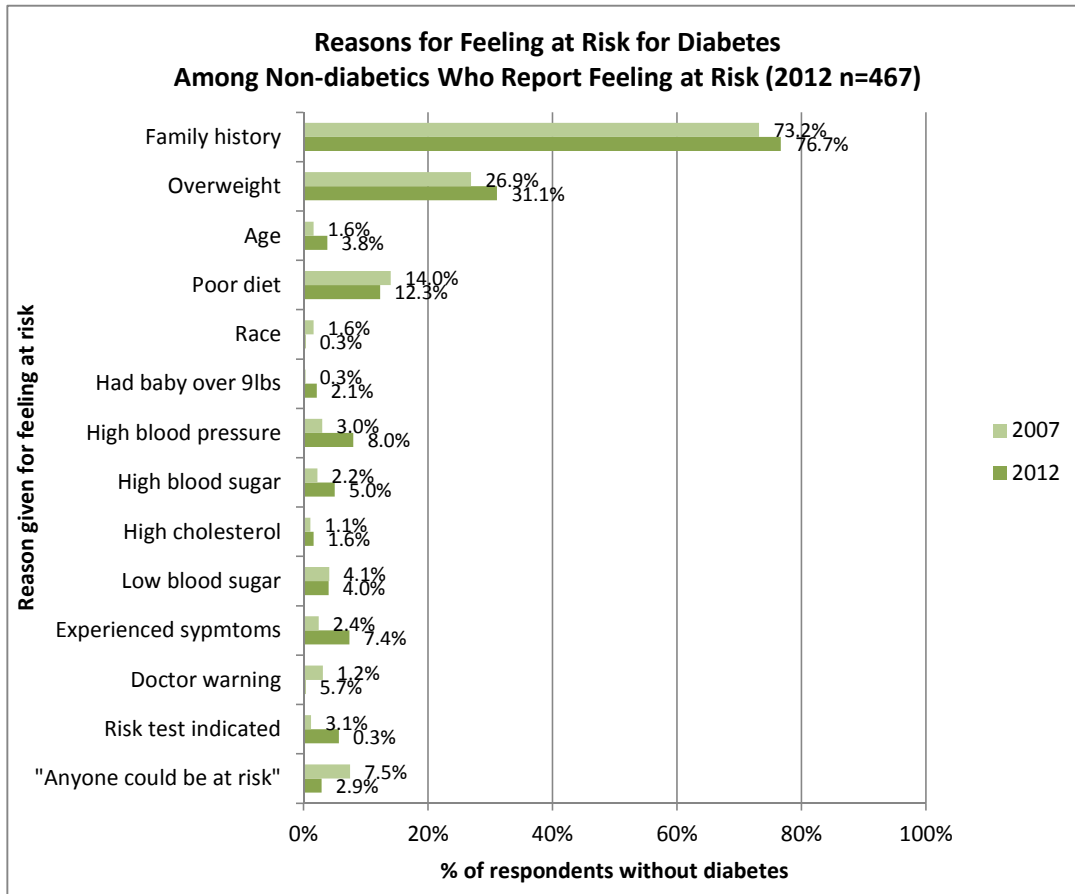
### Characteristics of Non-Diabetics with Elevated Risk (ADA score 5+)



It should be noted that significantly more “at risk” respondents reported familiarity with the term “pre-diabetes” in 2012 than in 2007 (70.3% vs 56.8%, respectively), while a lower percentage report ever having been screened (“blood sugar levels tested”) (84% in 2012 vs. 89% 2007). 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 (e.g., it may be assumed that any lab test involving a blood draw included blood sugar testing). Groups within the population 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 further explore the issue of perception and awareness of risk, 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 available to interviewers for coding purposes only). Results are highlighted below.



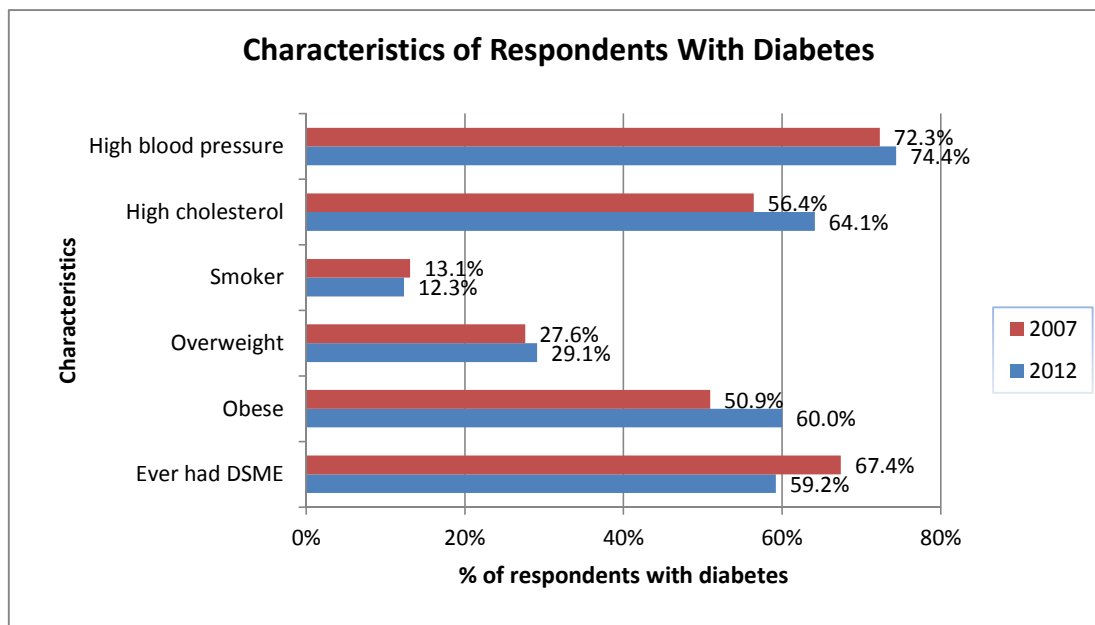


It should be noted that while age is in actuality the leading risk factor, few respondents (4%) cited it as a reason for feeling at risk. This could be due to lack of awareness of age as a primary risk factor, or the fact that it is a factor that cannot be reduced or impacted. Likewise, family history was much more likely to be reported as a reason for feeling at risk than being overweight (77% vs. 31%), despite the fact that high BMI actually increases risk more than family history. Family history was the most frequently cited reason for feeling at risk (77%); this compares to the 2008 NDEP survey of people age 35 and older, in which 63% cited feeling at risk due to family history. Also notable, significantly more respondents in 2012, as compared to 2007, cited high blood pressure, doctor warning, or experienced symptoms as reasons for feeling at risk for diabetes.

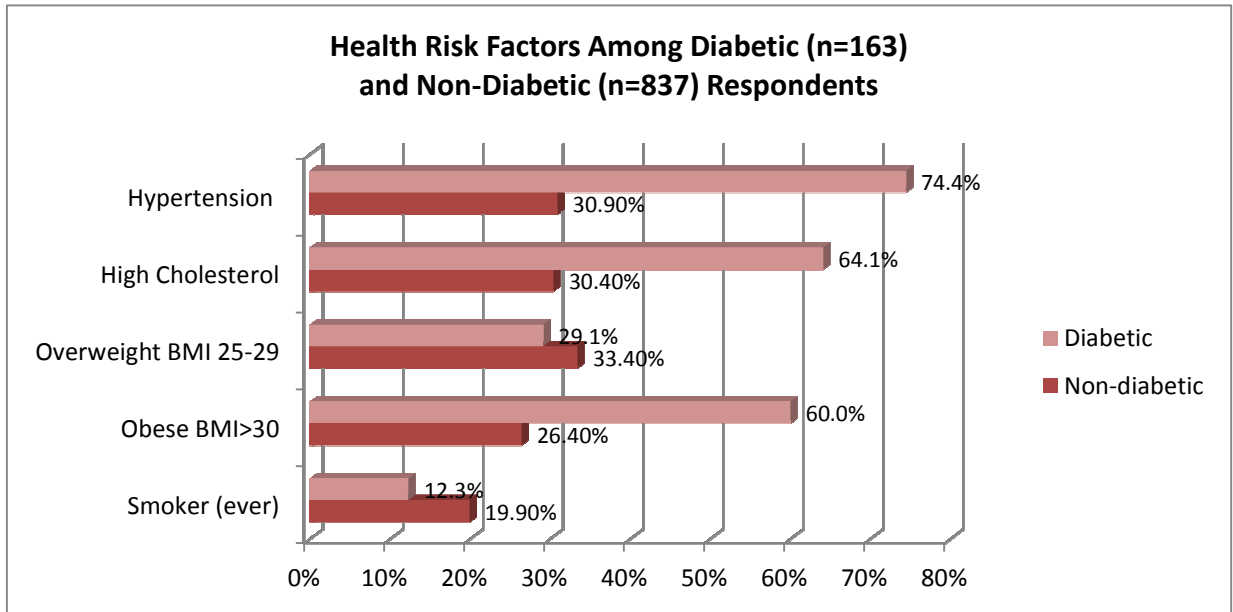
## Characteristics of People with Diabetes and Awareness Related to Diabetes Management

A series of analyses were conducted on the sub-sample of respondents reporting 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=163) is relatively small.

Approximately 59% of those diagnosed with diabetes reported having received diabetes education, down from 67% in 2007. Education was specified as “attended a series of classes or series of meetings with a diabetes educator.” This is displayed on the chart below along with additional characteristics of this group.

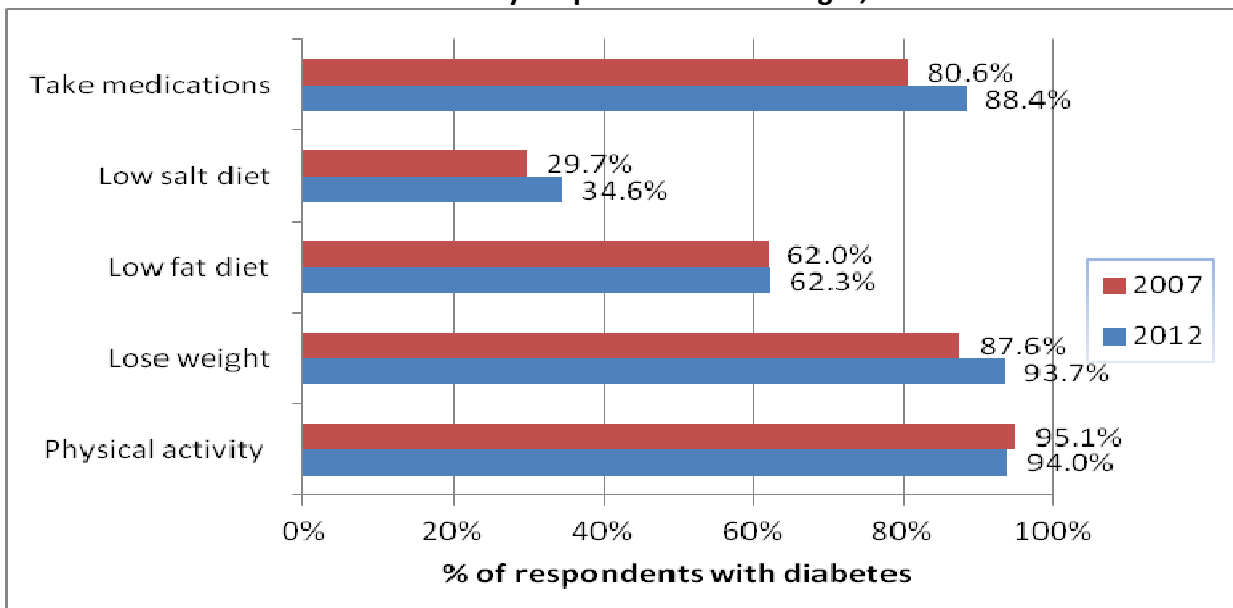


People with diabetes have high rates of risk factors that further jeopardize their health generally, and put them at increased risk for cardio vascular disease in particular. The majority of respondents reporting they have diabetes also reported being obese or overweight (60% and 29%, respectively), hypertension (74%) and high cholesterol (64%); while incidence increased in four out of five assessed characteristics from 2007 to 2012, the changes are not statistically significant. The chart below highlights the fact that rates are significantly higher among respondents with diabetes than among non-diabetic respondents.

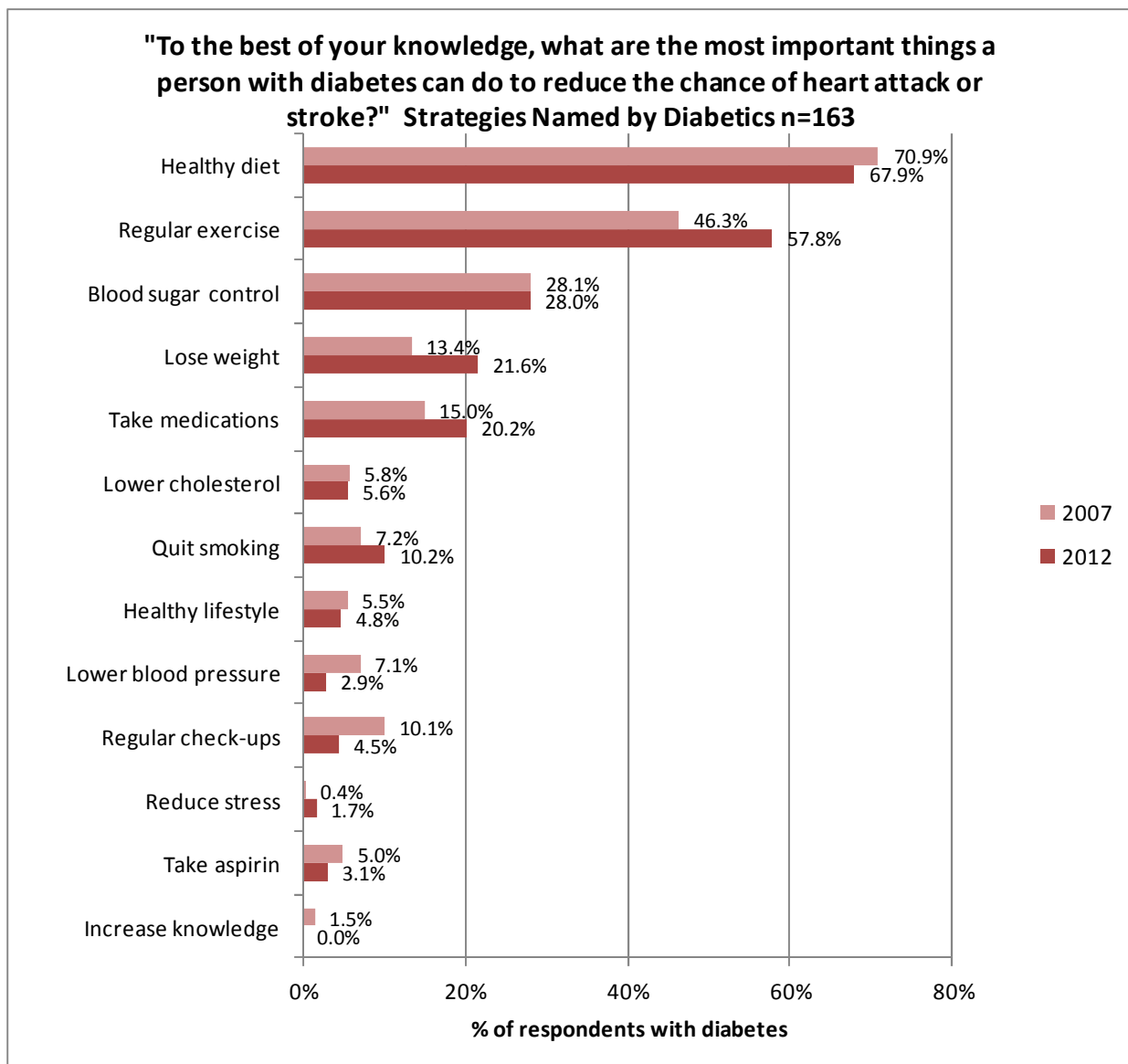


In order to explore awareness of effective strategies to manage diabetes, respondents were read a list of possible strategies for lowering blood sugar. When presented with potential strategies, there was high recognition of effective diabetes management recommendations. There was, however, an exception with regard to a low salt diet. Although it is not recognized as an effective strategy to lower blood sugar, 35% of respondents agreed that a low salt diet “would definitely help,” suggesting a certain level of confusion about dietary recommendations among the diabetic public.

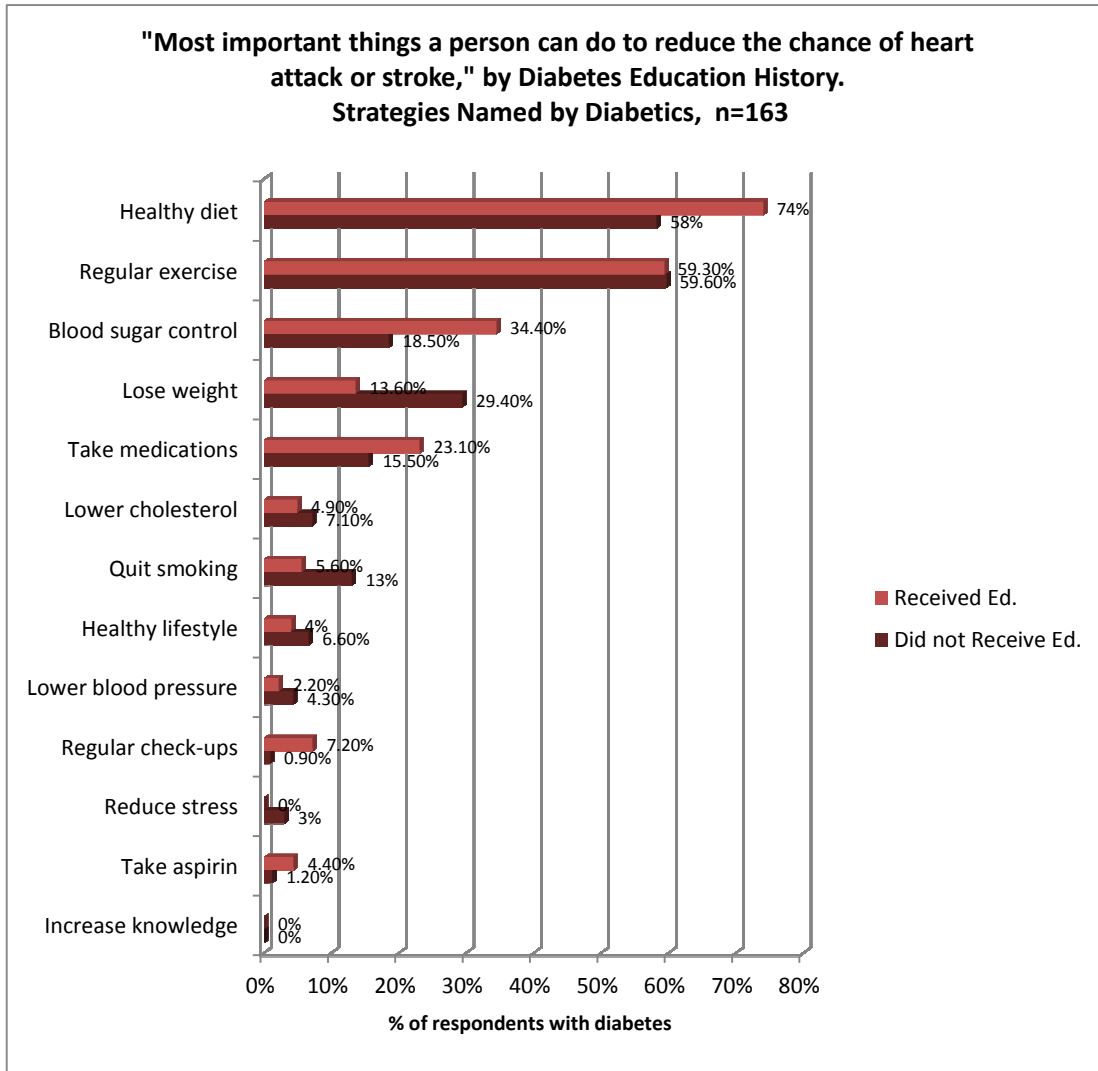
**Respondents With Diabetes Indicating an Identified Strategy  
“Would Definitely Help” Lower Blood Sugar, n=163**



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?” This question was open ended to respondents, though interviewers used a list of potential responses to code. In general, with the exception of “healthy diet,” there was much lower identification of effective strategies when this question was posed in an open ended manner as opposed to when the respondent was presented with strategies for evaluation. While a high percentage of respondents with diabetes reported a healthier or better diet (71%) as important, results suggest low awareness and recognition of other key diabetes management strategies, including losing weight (22%), taking medication (20%), and lowering cholesterol (6%). There was a slightly higher recognition of blood sugar control (28%) and exercise (58%) as important strategies. The chart below displays results by year. Though the frequency with which strategies were cited varied from 2007 to 2012, results are not statistically significant.



Respondents who reported having received diabetes education were better able to identify five of thirteen assessed risk reduction strategies, including healthy diet, blood sugar control, taking medications, regular check-ups, and taking aspirin. With regard to the percentage of respondents able to cite blood sugar control as an effective strategy, the difference between those with and without a history of diabetes education is statistically significant.

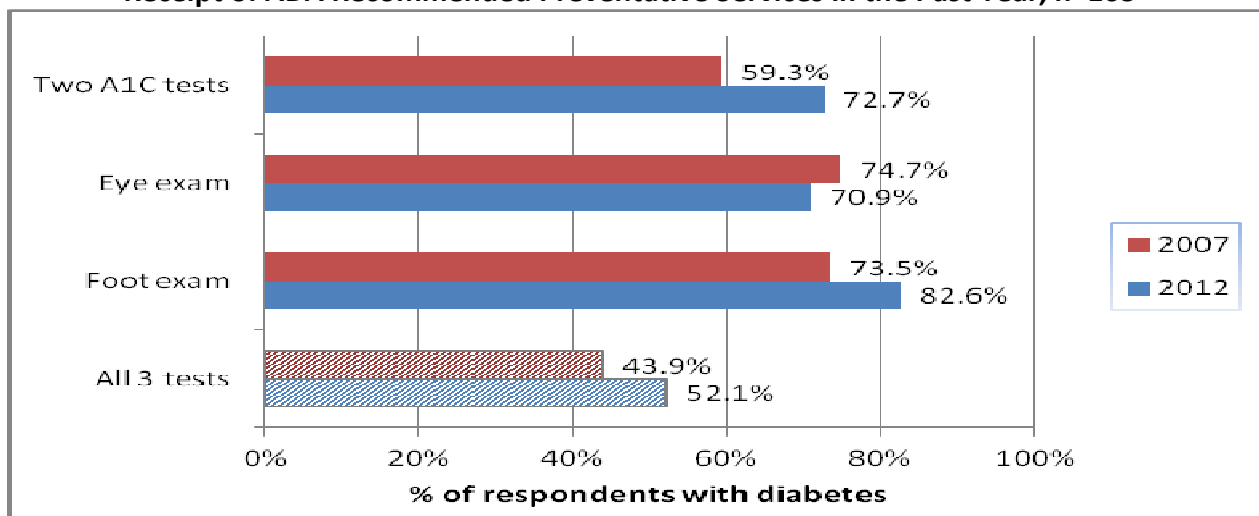


### Preventive Care/Awareness of Care Recommendations Among Respondents with Diabetes

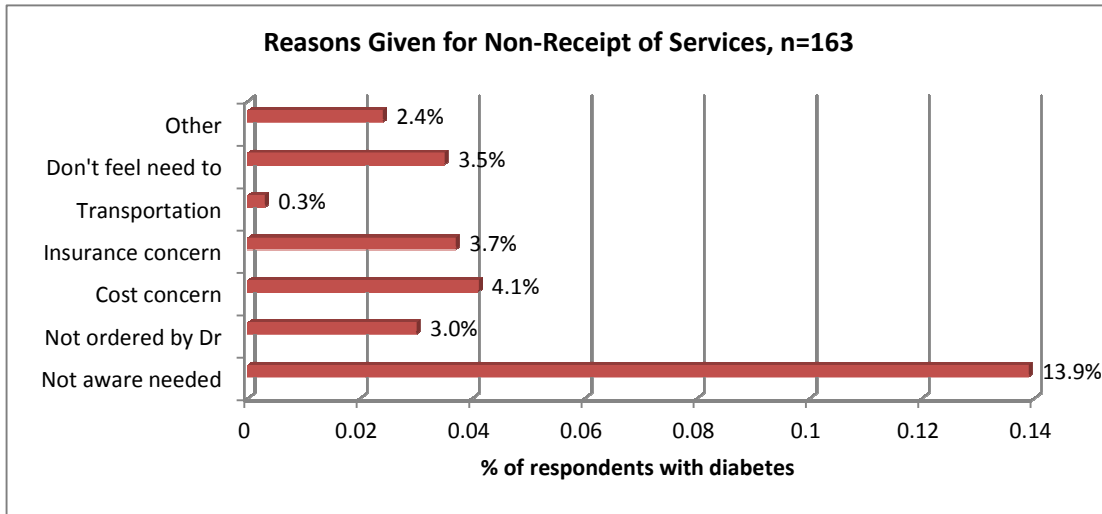
ADA guidelines affirm the benefit of a wide range of medical, psychosocial and educational services for people with diabetes. Official ADA treatment plan recommendations include ten “core” preventive care services. The following should be monitored regularly: hemoglobin A1c (every 3-6 months), blood 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 (71% - 83%), with the recommended eye exam presenting the lowest compliance and the foot exam presenting the highest. The majority of respondents with diabetes reported receiving at least one of the three services assessed, however just over half (52%) reported receiving all three. This suggests that a substantial number of diabetics are not receiving the comprehensive care recommended by the ADA. On a positive note, the increase in receipt of A1C tests (two per year), from 59% compliance in 2007 to 73% in 2012, is statistically significant.

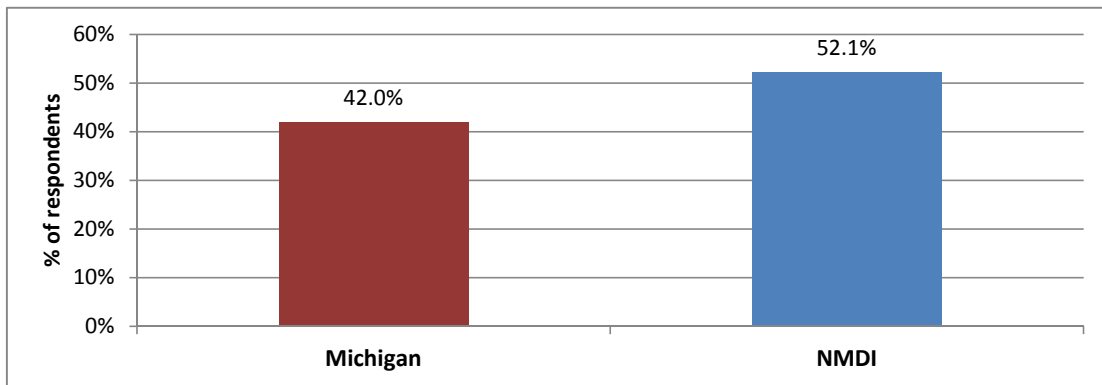
**Receipt of ADA Recommended Preventative Services in the Past Year, n=163**



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 being unaware of need. Concern about cost or insurance coverage or and “Don’t feel need to,” and providers not ordering the services were other frequently cited reasons.

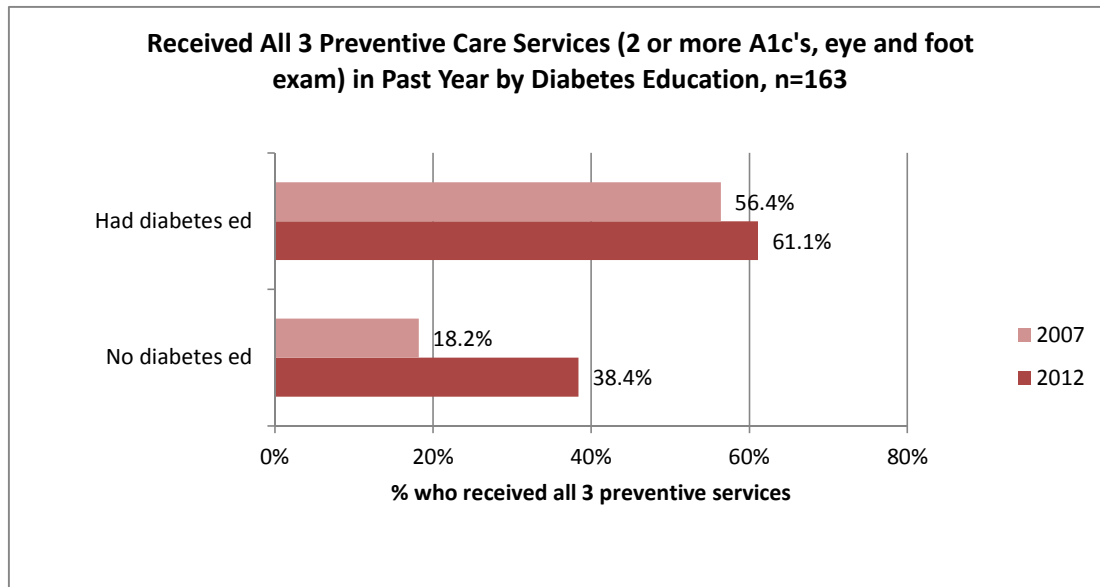


The NMDI 11-county rate for receipt of all three primary ADA-recommended preventive services in the past year is approximately 10% higher than the rate reported at the state level.



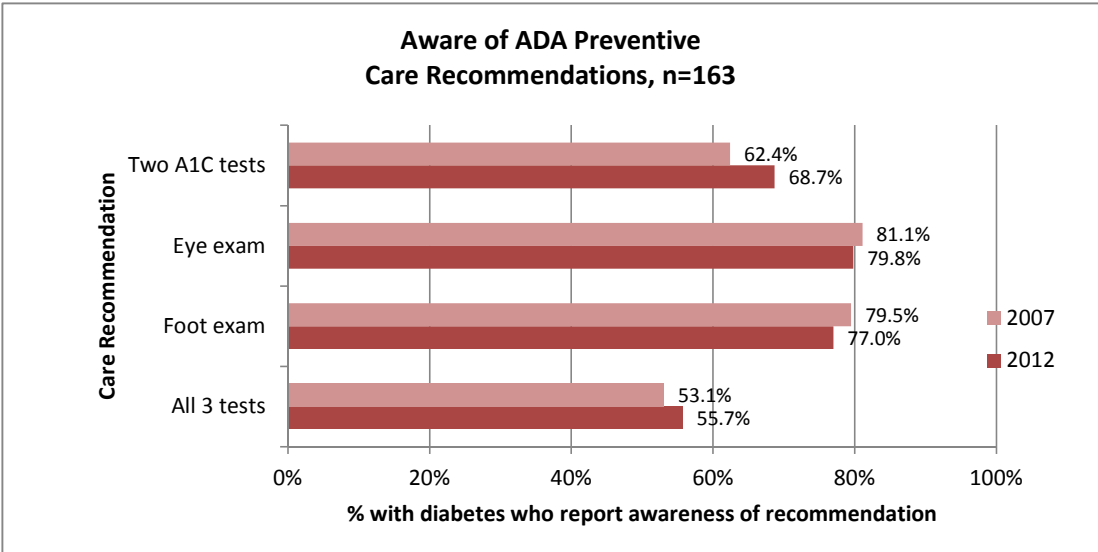
Michigan data: 2008-2010 Michigan Behavioral Risk Factor Survey. [http://www.michigan.gov/mdch/0,1607,7-132-2940\\_2955\\_2980\\_3168-238781--,00.html](http://www.michigan.gov/mdch/0,1607,7-132-2940_2955_2980_3168-238781--,00.html)

Receipt of all three preventive care services was analyzed by history of diabetes education and yielded significant results. In 2012, respondents with diabetes who had ever received diabetes education were more than one and a half times more likely to have received all three preventive care services in the past year than people without a history of education. This difference, highlighted below, is statistically significant. It should also be noted that respondents reporting they had received all three tests, with no diabetes education, significantly increased from 2007 to 2012.

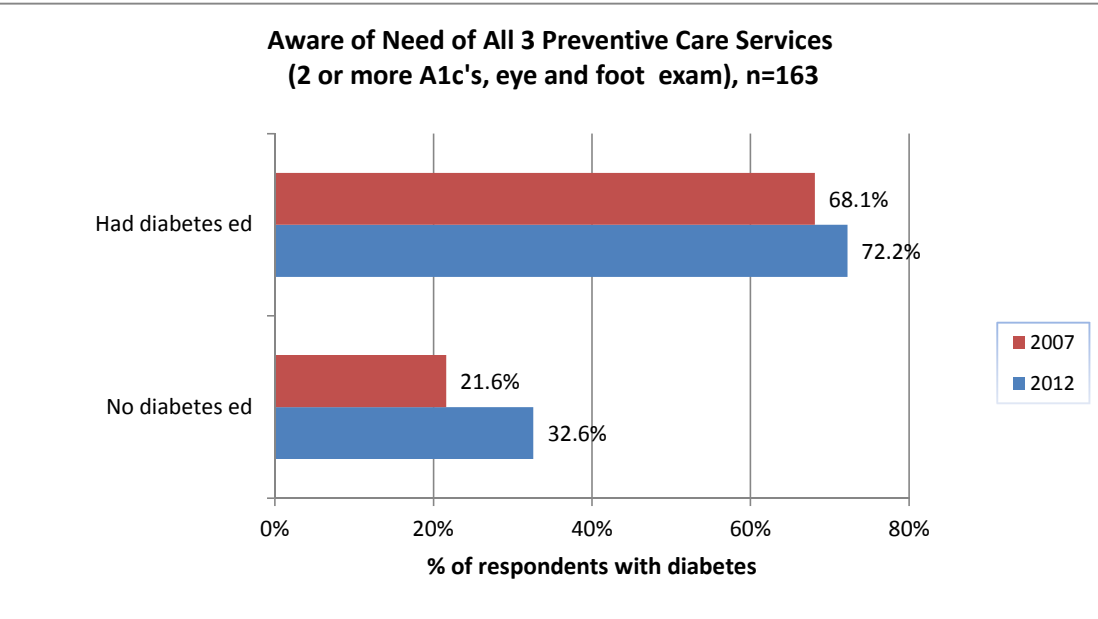


When asked about awareness of the need for specific services, a similar pattern emerged. While there were high awareness levels for the three services individually, only slightly more than half of respondents (55.7%) with diabetes were aware that they needed all three primary ADA-recommended preventive care services.



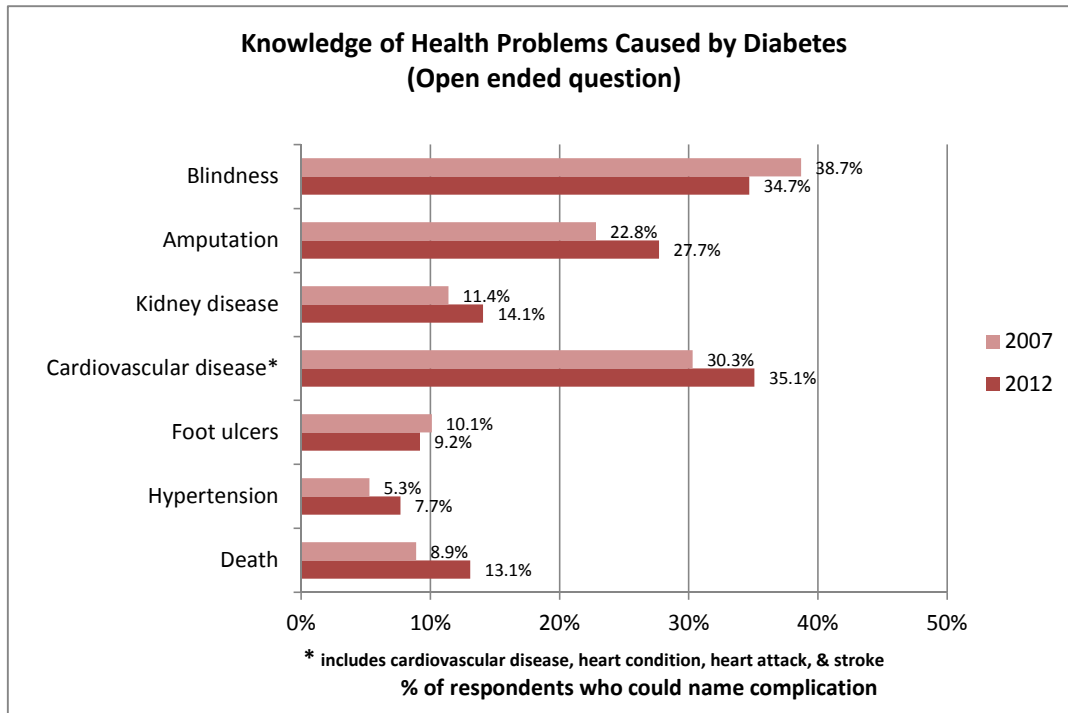


While compliance with two of the three tests fell slightly from 2007, and one increased slightly, these shifts are not statistically significant. As was the case for receipt of preventive services, awareness of the need for all services was highly associated with having ever received diabetes education; as highlighted below, respondents with a history of diabetes education were more than two times as likely to be aware of the need for all three preventive services.



## General Population Knowledge of Key Facts about Diabetes

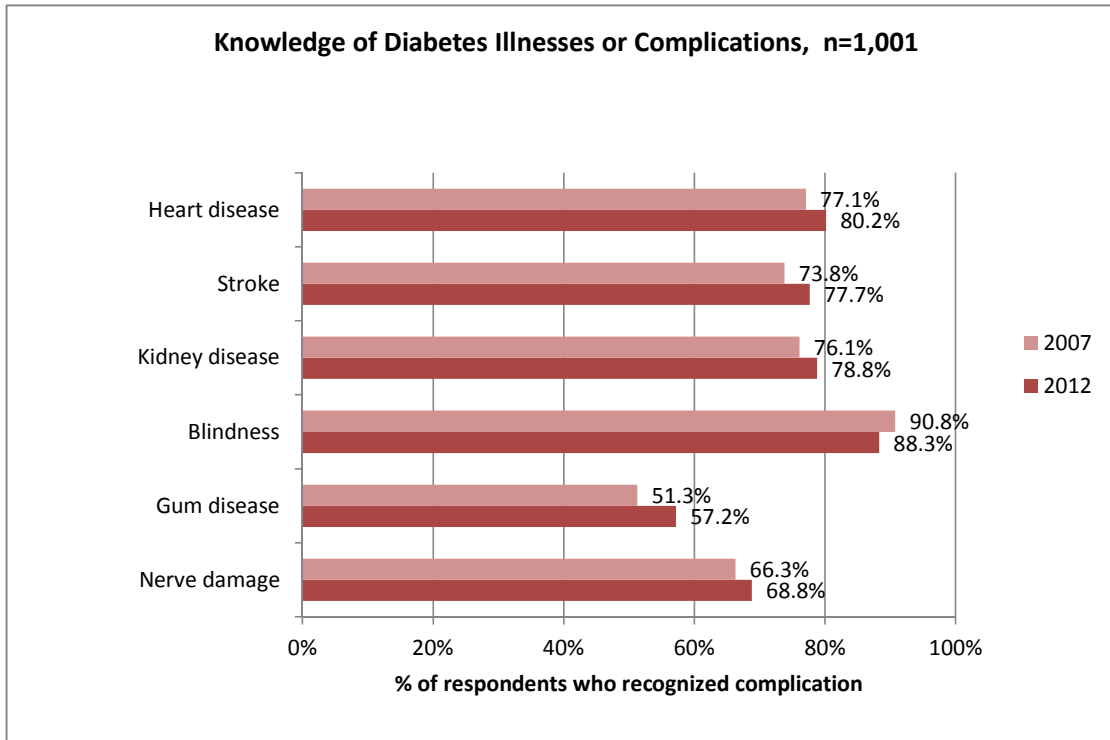
A number of survey questions sought to explore the general adult population's knowledge of key facts about diabetes in order to identify public education needs. The first question was open-ended and designed to identify health problems caused by diabetes which are foremost in the public's mind.



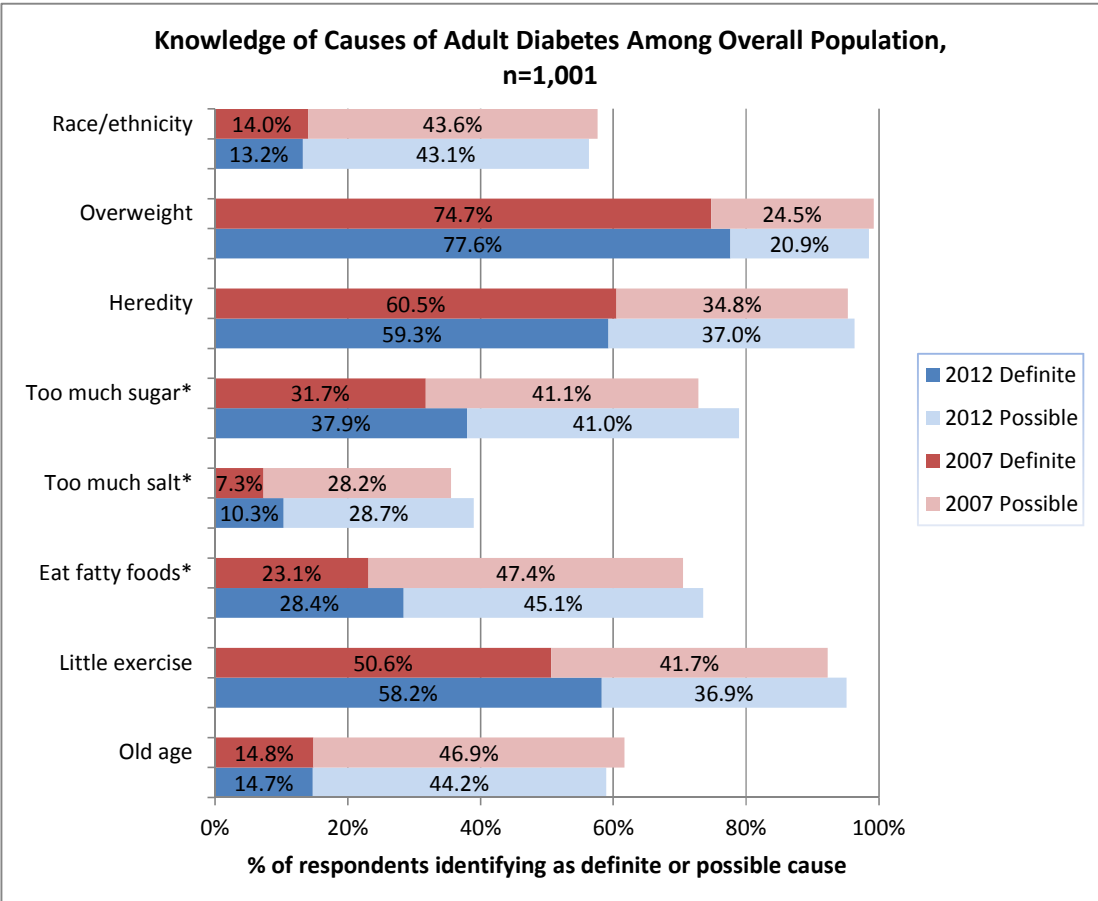
There was a statistically significant increase in identification of two of the seven most serious health problems caused by diabetes, with a greater number of respondents citing Amputation and Death in 2012 as compared to 2007. Increased identification with regard to Kidney Disease, Cardiovascular Disease and Hypertension is also notable.

The second question presented respondents with a list of known potential diabetes complications to assess the degree to which each is recognized as being caused by diabetes. There was a statistically significant increase in recognition of two of the six identified health problems, with a greater number of respondents citing Stroke and Gum Disease in 2012 as compared to 2007. Conversely, there was a statistically significant decrease in the number of respondents citing blindness as a complication.

Overall, both sets of results (highlighted in the chart above and below) suggest low to moderate awareness and recognition of the most common illnesses or complications.

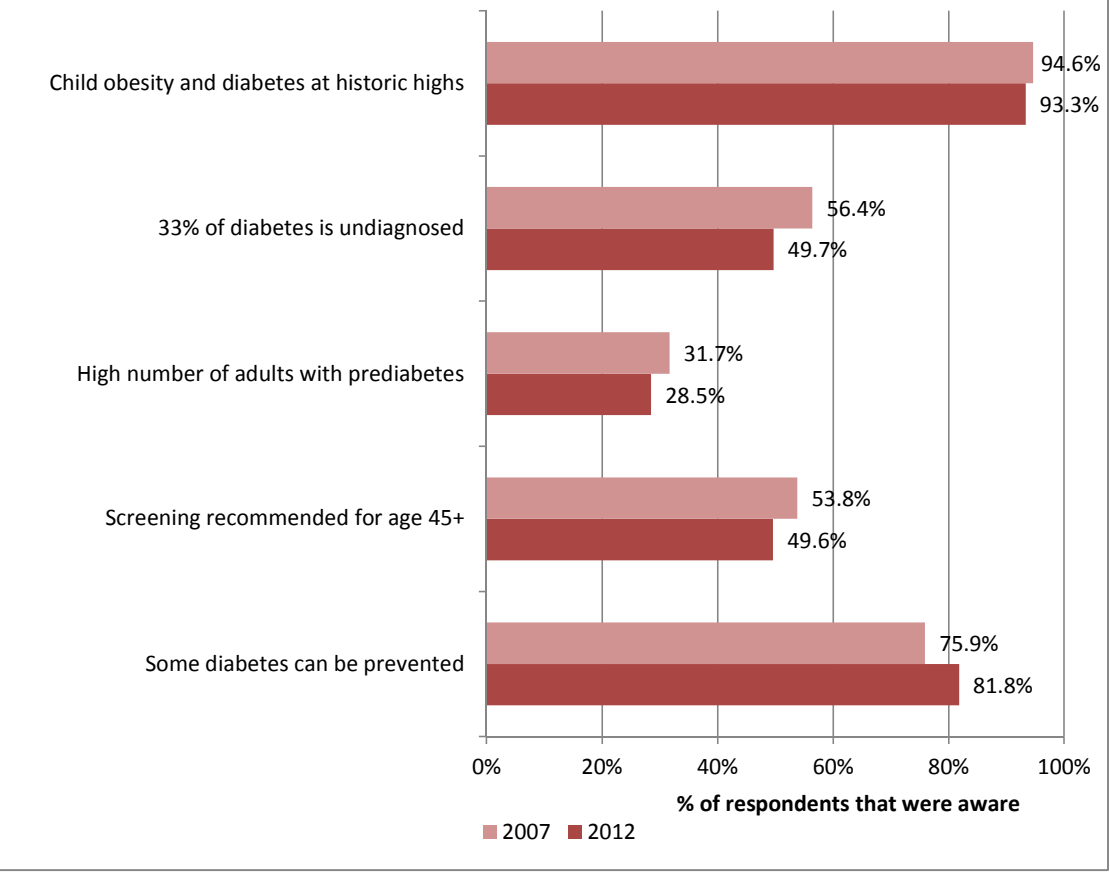


Next, a list of known causes/risk factors for diabetes, as well as several prevalent myths about dietary causes, was read to respondents who were then asked whether they felt each was a definite, possible or not a cause of diabetes. There was generally high recognition of all the leading risk factors for diabetes, with the exception of race and age; only 14% and 15%, respectively, identified each as a definite cause, which is similar to national NDEP survey finding (11%). *Eating fatty foods* and *too much sugar* were frequently cited as definite or possible 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 are not independently known to cause diabetes. Respondents in 2012, as compared to 2007, were significantly more likely to cite being overweight, too much sugar, eating fatty foods, and lack of exercise as causes. The following table displays these results.



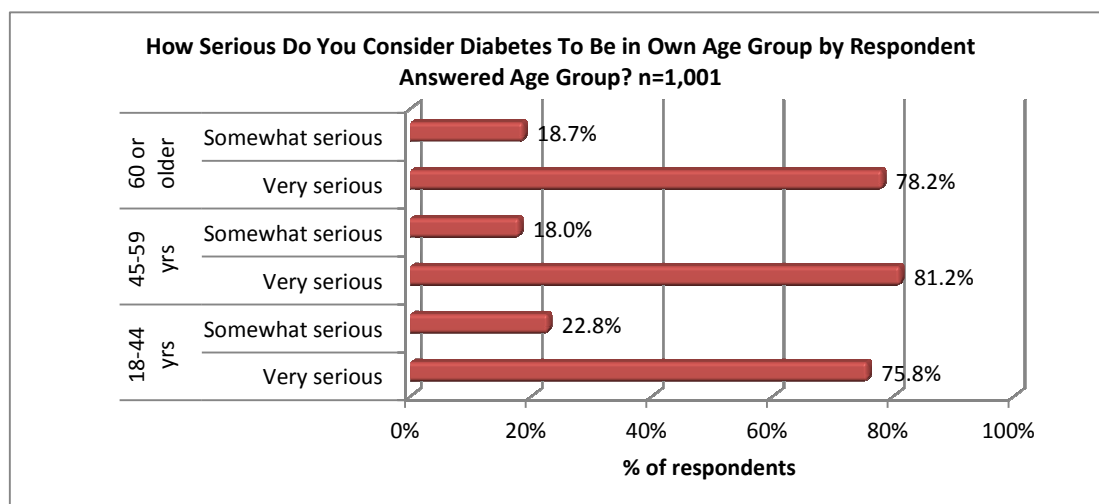
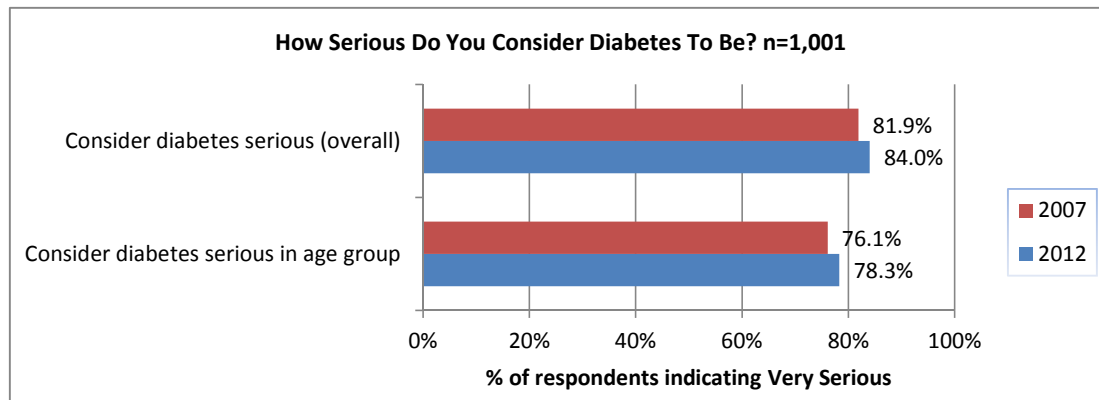
Survey respondents were asked if they were aware of several facts that have had wide national, regional, and in some cases local news coverage related to the magnitude of diabetes in the U.S. population. There was very high awareness of the historically high rates of childhood obesity and that *some forms of diabetes can be prevented* (93% and 82%, respectively). With regard to the latter, significantly more respondents in 2012, as compared to 2007, indicated they were aware of this fact (82% vs. 76%). In addition, approximately 50% of respondents indicated they were aware *close to one-third of persons with diabetes in the United States do not know they have it*, which is a significant decrease from reported awareness in 2007 (56%). Relatively few respondents (29%) reported they were aware *79 million people currently have a condition called pre-diabetes*. The table below highlights these findings.

**Awareness of Current Diabetes Prevalence Facts  
(Source:ADA) Among Overall Population, n=1,001**



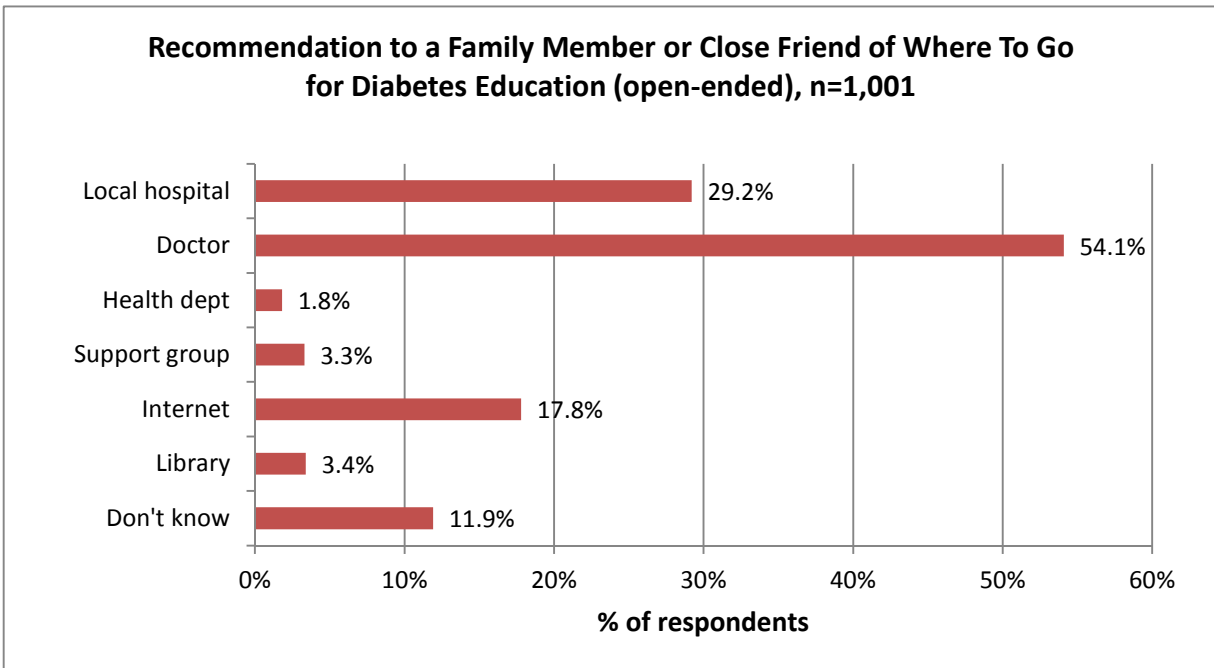
## General Population Awareness And Attitudes Related to Diabetes

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. The vast majority of respondents rated diabetes as “Very Serious” (84%) or “Somewhat Serious” (14.7%). This is somewhat higher than the national NDEP survey, nationally representative of the U.S. adult population 35 years of age and older, which found that 85% of adults rate diabetes as serious in general. Survey respondents also rated how serious they consider diabetes to be in own age group, with 78% indicating “Very Serious” and 20% indicating “Somewhat Serious.” The following charts highlight these results.

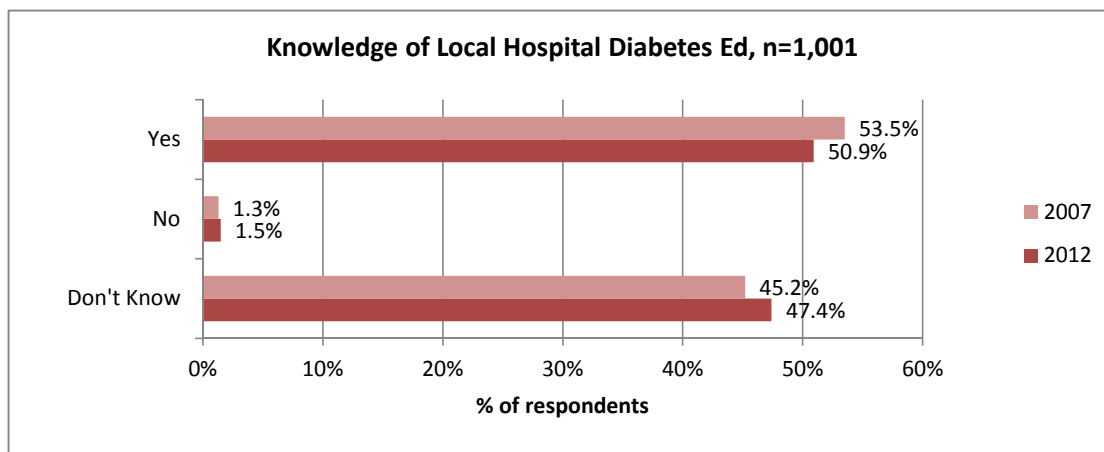


Diabetes education programs are a key resource for the community. A primary aim of the NMDI is to increase public awareness of resources for people with diabetes in order to engage the community in improved diabetes management. The current survey provides an opportunity to collect data for comparison to the 2007 baseline, gauging impact and effectiveness on awareness of local diabetes education programs.

An open-ended survey question asked respondents if a friend or family member were newly diagnosed with diabetes, where would they recommend they go for education. Results indicate that doctors come to mind most frequently (54%) as a source for diabetes education, with local hospital as the second most frequently cited source (29%). These findings underscore the importance healthcare providers and systems can play in increasing awareness about diabetes education. Results are highlighted in the following chart.

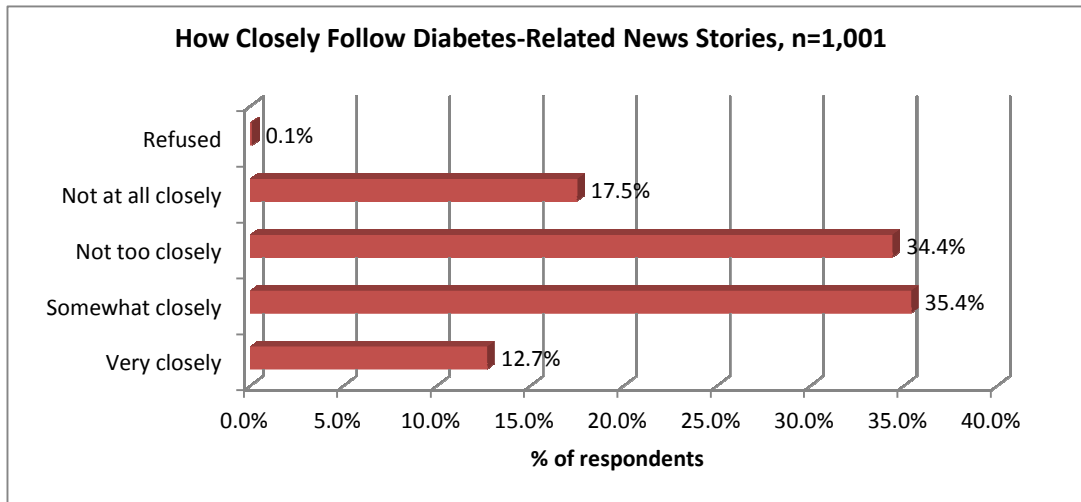


A follow-up question asked respondents if their local hospital, specifically, offered diabetes education. In general, there is moderate knowledge of local programs, with 47% of respondents reporting they do not know if their local hospital offered programs. Results are highlighted below.



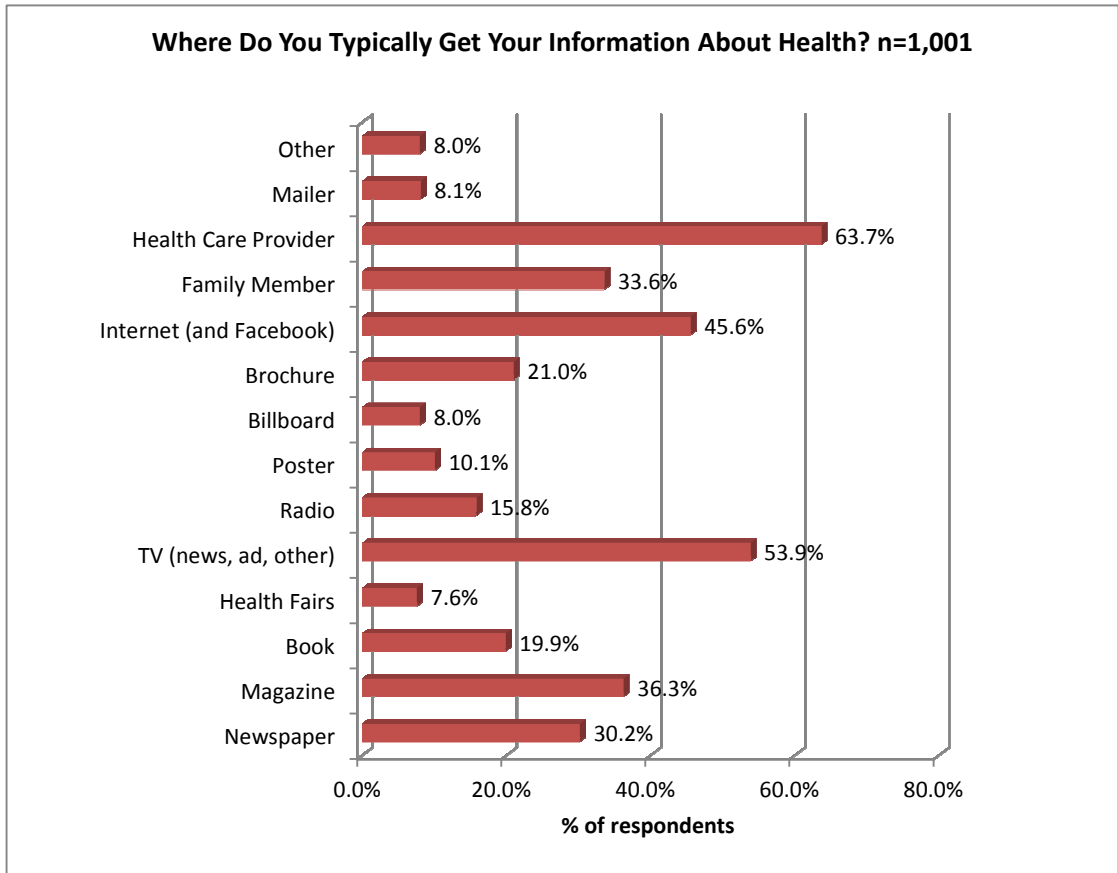
### Interest in Diabetes and Sources for Health Information

To gauge the general level of interest in the topic of diabetes, respondents were asked how closely they follow news stories on diabetes. Overall, 48% of respondents reported that they follow news stories about diabetes very closely or somewhat closely (12.7% and 35.4%, respectively). The table below highlights results.



In order to explore potential effectiveness of specific media outlets for communication of diabetes-related information, respondents were asked to report where they typically get their *information about health*; a list of 17 potential sources was presented. Overall, the most frequently reported sources for health information included health care providers (63.7%), TV (53.9%), Internet/Facebook (45.6%), magazines (36.3%), and a family member (33.6%). The following chart highlights these results.





Note: For analysis purposes, TV news, TV commercials, and Other TV were collapsed into a single response category (TV). Internet and Facebook responses were also collapsed into a single category.

Additional analyses revealed identified top information sources varied by age of respondent. Respondents aged 25 through 64 consistently cited health care provider, television and Internet/Facebook, while respondents age 18 – 24 included family member (and not television) and those over 65 included magazine (and not Internet/Facebook). The top three sources of health information by age group are presented below:

Age Group	Top Three Sources of Health Information
18-24	provider, Internet/Facebook, family member
25-34	provider, Internet/Facebook, television
35-44	provider, Internet/Facebook, television
45-54	television, provider, Internet/Facebook
55-59	television, provider, Internet/Facebook
60-64	provider, television, Internet/Facebook
65+	provider, television, magazine

## **Appendices**

### **Appendix A 2012 Survey Committee Members**

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### **Appendix B Survey Instrument**

### **Appendix C ADA Risk Test**