

The Impact of Rural Community-Based Diabetes Screenings to Motivate Clients to Action

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Context: Community-based screenings have demonstrated moderate success for early detection and prevention of a variety of disease states in selected populations. However, few studies have illustrated the benefits of community-based screenings in rural populations for their ability to motivate participants to improve health behaviors.

Purpose: Community-based diabetes screenings were conducted on two occasions in a rural community with a high prevalence of diabetes-related medical complications. Study participants were surveyed 3-months post-screening to determine the impact of the screening as motivation to change behaviors known to influence diabetes risk; and for those with diabetes, to motivate changes in self-management behaviors.

Methods: Screening data was used to classify participants by diabetes status (current diagnosis of diabetes, no diagnosis but at risk, or no diagnosis and not at risk). Participants completed a health behavior assessment at the screening and 3 months following the screen. Data from the follow-up survey was used to determine self-reported behavior changes that participants attributed to the screening.

Findings: Fifty-four of 78 participants who were screened returned follow-up surveys for a response rate of 69%. Over half of the respondents (56%) were motivated by the screening to exercise more, while 82% were motivated to watch their dietary intake. Of respondents with diabetes, 80% were motivated to exercise more, 100% were motivated to watch their dietary intake, 75% were motivated to check blood glucose levels more frequently, and 67% were motivated to take medications on time.

Conclusion: Rural community-based screenings for diabetes can be an effective intervention to motivate health behavior change in individuals with and without diabetes.

Introduction and Review of Literature

The Centers for Disease Control and Prevention (CDC) estimate that in 2007, 23.6 million people in the United States or 7.8 percent of the population, had diabetes. This reflects a total of 17.9 million diagnosed and 5.7 million undiagnosed individuals (CDC, 2007). The American Diabetes

Association (ADA) estimates that the total costs of diabetes care in 2007 was \$174 billion including \$116 billion in excess medical expenditures and \$58 billion in reduced productivity. Uncontrolled diabetes can lead to serious complications including heart disease, stroke, hypertension, blindness, renal disease, central nervous system disease, amputation, and even death (ADA, 2008). The growing prevalence of diabetes demonstrates the need for community-focused interventions

that can influence early detection and prevention of the disease (Ackermann & Marrero, 2007).

Community screenings for diabetes have been shown to be moderately successful for disease detection in defined populations such as medically underserved individuals (Tabaei, et al., 2003; Grant et al., 2004). Rural areas of the US often qualify as medically underserved areas due to inadequate access to a variety of medical services. The burden of inadequate health services is often painfully clear to rural residents: One-half of older rural seniors feel that they do not have readily available information about diabetes and other chronic diseases (Rosenthal & Fox, 2000). Yet it has been illustrated that community-based screenings and health fairs in the rural settings have the capability to identify persons at risk for diabetes (Gamm, Hutchinson, Dabney, & Dorsey, 2003). Thus, community screenings can serve an ancillary role to the health care system in rural settings for detection of undiagnosed diabetes.

Access to medical care and services is quite limited in rural Eastern Washington. In 2006, seven communities were identified in Eastern Washington as having rates of diabetes and diabetes-related complications that exceeded the prevalence of these conditions for the entire state (Daratha & Polello, 2007). In an effort to impact these high-risk rural locales, the Eastern Washington Diabetes Network, a community coalition, developed an awareness and education plan to focus on one of these communities; Chewelah, Washington. Chewelah has a population of 2,186 with approximately 12% of the population of an ethnic or minority background, primarily Native American. One facet of the awareness and education plan was to conduct community screenings to identify those at risk for diabetes. The purpose of this study was to measure the effectiveness of the screenings as a means to motivate clients to change behaviors known to influence the risk for diabetes. The intent of the screenings was to increase the awareness of diabetes prevention strategies related to diet and exercise among the rural

residents and to increase awareness of proper self-management for those with diabetes. Impact of the screenings was assessed three months following the screening by surveying screening participants about whether the health screening motivated them to change health behaviors.

Methods

The screening activities, survey methodology, and survey instruments were approved by the Washington State University Institutional Review Board.

Protocol

Two free diabetes screening events were held on consecutive weeks at a private retail pharmacy in rural Chewelah, Washington. One month prior to screening activities, a local public awareness campaign was conducted to publicize the event as well as increase community awareness of diabetes prevention strategies and the need for individual screenings. The campaign targeted local residents through radio spots, newspaper advertisements, community bulletin boards, and billboard media. Third year Doctor of Pharmacy students conducted the screenings under the supervision of Pharmacy faculty. Study participants completed a health behavior assessment which was a brief written survey to identify demographic characteristics and medical history as well as diet, health, and exercise behaviors. Screening participants then proceeded to the student pharmacists who evaluated random blood glucose levels using a capillary finger stick technique known as a random blood glucose test using the OneTouch Ultra™ Glucose Monitoring system. The random blood glucose test examines blood sugar taken from a non-fasting patient and assumes a recent meal and therefore has higher values than the fasting glucose test. Blood pressure, height and weight were measured on each participant. In addition, body fat percentage and body mass index were also evaluated using

the Omron™ Fat Loss Monitor. For participants who did not report an existing diagnosis of diabetes, the student pharmacists calculated scores on the Diabetes Risk Test (DRT) (Herman, Smith, Thompson, Engelgau, & Aubert, 1995). Developed by the CDC and the ADA, the DRT is a brief self-report tool used for evaluating risk for previously undiagnosed diabetes. Random blood glucose levels were assessed following guidelines from the Diabetes Detection Initiative which takes into account patient age and postprandial time when evaluating appropriateness of random blood glucose levels. Screeners made recommendations back to the screening participants to follow one of three courses of action dependent on blood glucose test results and scores on the DRT: If random blood glucose was within normal ranges and DRT scores indicated low risk (DRT score ≤ 9 points, blood glucose level less than 160 dependent upon the postprandial time), participants were given preventative diabetes counseling. Participants without a diagnosis of diabetes but whose random blood glucose values were above the expected range were encouraged to follow-up with a health care provider. Finally, screening participants with a self-reported previous diagnosis of diabetes were referred to a health care provider if blood glucose values were beyond normal ranges. All participants received directed education based upon the results of their survey answers and screening assessments. In conjunction with the counseling, written materials produced by the National Diabetes Education Program (NDEP) were provided to the participants free of charge. Participants also received a listing of local and regional health care providers to contact for diagnostic and/or diabetes management care. Finally, participants were encouraged to consent to follow-up contact three months following the screening event.

Health screening and education was provided to 97 individuals with 78 of these individuals consenting to be contacted by mail at 3-months in

order to once again complete the health behavior surveys.

Follow-up Survey Instrument Development and Procedures

Survey items were developed based on content validity principles in which experts in diabetes, pharmacotherapy, and research methodology wrote and revised an initial pool of items. As no previous survey tools were identified that assessed motivation to action as a result of a health screening event, a new tool was developed. Items were designed to assess behaviors identified by the American Diabetes Association (American Diabetes Association, 2007) as those recommended to prevent diabetes and diabetes-related complications. Following item pre-testing with diabetes experts, one intake survey instrument and three separate follow-up survey instruments were developed: one for those with an existing diagnosis of diabetes; one for those without an existing diagnosis, but who were recommended to see a medical provider for follow-up; and one for individuals without a self-reported previous diagnosis of diabetes, and who were not referred to a provider for additional diagnostic work. Each survey contained close-ended items asking about medical conditions, general health, exercise, diet, and health behaviors. In addition, and in line with the intent of the study, each follow-up survey contained items asking whether the screening event motivated behavior change in the participants. Participants rated their agreement with statements about the screening motivating behavioral change on 4-point "strongly agree" to "strongly disagree" Likert scale. The intake survey and each of the follow-up surveys are located in Appendices 1-4.

Survey Implementation

Participants completed the intake survey on the day of the initial screening event. In order to increase likelihood of an acceptable response rate to the follow-up survey, the Tailored Design

Methodology was used (Dillman, 2007). Prior to the delivery of the follow-up survey instruments, a reminder postcard was mailed to all screening participants. Follow-up survey instruments were delivered by first class mail approximately two-weeks following the postcard mailing. Each mailing contained a personalized cover letter, a respondent-friendly survey instrument, and a stamped return envelope. To encourage a favorable response rate, repeat mailings were sent 3 and 6 weeks after the first mailing to potential respondents who had not responded to previous mailings. Those who did not return follow-up surveys within 3 weeks were also contacted by phone.

Data Analysis

Quantitative data from the close-ended items using a nominal scale of measurement were analyzed and reported as proportions. Means and standard deviations were used to characterize quantitative data measured on a ratio scale. All analyses were conducted with SPSS, v. 15.0.

Results

Demographics of Study Participants

Table 1 lists general demographic and health status information for the 78 individuals who were screened and consented to be contacted at 3-months. Nearly 90% of participants rated their health as good to excellent. Health problems that were reported by more than 25% of the participants were hypertension, hyperlipidemia, and arthritis. The majority of participants were engaging in positive health behaviors at the time of the screening (reading food labels, exercising, not using tobacco products).

Table 2 lists means and standard deviations for various continuous measures obtained at the screening. The number of minutes of exercise was high, reflecting the high activity associated with the primary occupation in the region, farming. Mean diastolic blood pressure was in the

normotensive range (<80 mmHg.) with 48% of participants recording casual diastolic blood pressures in the prehypertensive (80-89 mmHg.) or hypertensive range (>90 mmHg.). Mean systolic pressure was in the prehypertensive range (Chobanian et al., 2003), with 74% of participants recording casual systolic blood pressures in the prehypertensive (120-139 mmHg.) or hypertensive range (>140 mmHg.). The mean blood glucose of the group was within target ranges established by the ADA (2007). Mean body mass index fell into the overweight range according to the National Heart, Lung and Blood Institute (1998) with 80% of participants falling into the overweight to morbidly obese categories. The mean Diabetes Risk Test score fell below the cutoff for high risk of diabetes by 10 points (Herman, et al., 1995); however, 42% of participants had scores that exceeded 10 points.

Frequency of Annual Tests Obtained by Participants with Diabetes

Table 3 lists the frequencies at which participants with diabetes (n = 8) received routine tests or recommended prophylactic procedures (vaccinations and aspirin). While the majority of participants with diabetes had obtained a foot examination, an eye examination, a vaccination for pneumonia, and took aspirin regularly, none of the recommended tests were obtained annually by all participants with diabetes. Only one of 8 had obtained an influenza vaccination, and only half reported having an HbA1c test in the past year.

Follow-up Survey Analyses

Fifty-four of the 78 participants who were screened returned 3-month follow-up surveys for an overall response rate of 69%. Forty-seven of 66 who were not referred to a provider at the screening returned follow-up surveys, while 2 of 4 who were referred to a provider based on screen results returned follow-up surveys. Of the 8 participants with diabetes who were screened, 5 returned follow-up surveys. Due to the small number of responses from the group referred to a

provider, analyses were conducted on the screening participants as a whole. However, subgroup analyses were conducted on responses from those with diabetes to determine whether the screening motivated participants to action to change behaviors associated with complications from diabetes.

Screening Influence on Motivation to Change Health Behaviors in All Respondents

Table 4 displays responses to inquiries about whether written materials and verbal information distributed at the screening motivated participants to action to change health behaviors. The majority of respondents agreed or strongly agreed that the screening influenced them to exercise more or watch their diet based on information provided by the students. On the other hand, the majority of respondents disagreed or strongly disagreed that the screening influenced them to obtain vaccinations for influenza or pneumonia. Four in 10 respondents who used tobacco indicated that the screening motivated them to stop using tobacco.

Screening Influence on Motivation to Change Health Behaviors in Respondents with Diabetes

Table 5 displays responses specifically for participants with diabetes. The sample size of subjects that had a previous diagnosis of diabetes was very small (n=5) and therefore any conclusions based on this work should be done with caution. Acknowledging this, there are some interesting observations that are worth noting. For each health behavior, a proportion of participants with diabetes were already engaging in the activity or had already planned to obtain a screening test. Of those not already engaging in the health behaviors, a majority agreed that the screening motivated them to exercise more, watch their diet, take diabetes medication on time, obtain a dilated eye examination, take aspirin

daily, and check blood glucose more often. However, a majority of respondents disagreed that the screening influenced them to obtain vaccinations for influenza or pneumonia, obtain an HbA1c test, or obtain a foot examination. Only 2 respondents with diabetes used tobacco, with 1 of the 2 indicating that the screening provided motivation to stop using tobacco.

Discussion

The purpose of this study was to measure the effectiveness of a rural community diabetes screening and education intervention as a means motivate adherence to or adoption of health behaviors known to positively impact the risk for diabetes. Results indicated that the screenings were successful for motivating a majority of the participants to change health behaviors. Of the 78 participants who participated in the initial screening and education event, nearly 90% reported their health as good or excellent at the initial screening. However, although their perception of their actual health was favorable, biometric data collected at the screening revealed otherwise. More than 25% of the participants were found to have blood pressures in the hypertensive range, and many reported having arthritis or hyperlipidemia. In addition, the reported minutes of exercise were high, but 80% of the participants were found to be overweight or obese. This is consistent with the national obesity trends where the self-reported obesity rates are higher in rural areas compared with urban communities (Gamm, et al., 2003). In this population, it appears that there is a disconnect between self-perception of health status and clinical measures of health status. This divide warrants future investigation as motivation of clients to change requires their understanding of the benefit of change. Screened participants with a self-reported previous diagnosis of diabetes represented 10% of the overall sample. In addition, 5% of the

screened participants had blood glucose levels that prompted us to refer them to a provider for diagnostic testing. If each of these participants had undiagnosed diabetes, the prevalence in our sample would have exceeded the 2.5% rate of undiagnosed diabetes estimated for the general U.S. population (CDC, 2007).

The proportion of participants with diagnosed diabetes that received routine tests and procedures at recommended intervals was far below 100%, which could be reflective of the limited access to diabetes care in this rural area. Only half of the participants received an HbA1C test in the previous six months. While routine dilated eye exams (75%) and foot exams (86%) were more predominant, influenza vaccination was not common in the diabetes subgroup, with only 13% of the participants receiving a vaccination in the previous twelve months. As was apparent from this screening, community screening events represent opportunities for qualified screeners to provide one-to-one education and distribute education materials on importance of routine annual tests and preventive procedures for those with diabetes.

Using community-screening events to motivate rural residents to change health behaviors has not been widely examined. Results from this screening event reveal that screening events have the potential to motivate clients to health behavior change. At the 3-month follow-up, over half of the sample (56%) indicated that the screening motivated them to exercise more, while 82% were motivated to watch their dietary habits. Only 8% of the sample was motivated to obtain an influenza vaccination following the screening event, which indicates the need for increased education about influenza vaccinations for participants of screening events without diabetes. The screening event was more influential among participants with diabetes. Following the screening, 80% of those with diabetes were motivated to exercise more, and 100% were motivated to watch dietary habits. This is a significant finding as diet and exercise related

behavior changes are the most difficult behavior changes to initiate and sustain (Feinstein & Feinstein, 2001; Pi-Sunyer, 2006). In addition, several diabetes management behavior changes were also noted with 75% of the participants motivated to check their daily blood glucose levels more frequently, and 67% motivated to take their diabetes medications on time.

From a conceptual perspective, the success of the screening event for prompting the participants to implement behavior change can be couched in terms of the transtheoretical model (TTM) of behavior change. The TTM provides a conceptual framework for understanding chronic behaviors that encompass a sedentary lifestyle, and has been used as a basis for understanding interventions aimed at behavior change (Fahrenwald & Walker, 2003; Marcus & Simkin, 1994; Prochaska & Velicer, 1997a, 1997b; Woody, DeCristofaro, & Carlton, 2008). The TTM proposes that an individual progresses through five stages in a non-linear fashion on the way to sustained behavioral change: precontemplation, contemplation, preparation, action and maintenance. Individuals in the precontemplation phase are often uninformed about the importance of a specific behavior change, while individuals in the contemplation stage are more likely to recognize the benefits of a change, but are unprepared to take action. Individuals in the preparation stage have decided to make a change and welcome assistance in the implementation of a change. Although individuals at any stage of change could be attracted to free community health screenings, it is plausible that many of the participants were in the contemplation or preparation phase, thus more likely to be motivated to initiate behavior changes as a result of the screening event. Now that we have established that screening events can serve as motivation to change health behaviors, our future work will aim at determining the relationship between the stage of change a participant is in and the motivation these individuals experience

as a result of receiving screening results and education.

Many studies illustrate the effectiveness of healthcare providers and health educators as a source of support for clients in the stages of behavior change (Cole, 2001; Keller, Allan, & Tinkle, 2006; Singer, 2007). The method by which the screening event for this study was conducted is atypical of most screening events since participants knew that follow-up contact would be made to assess the impact of the screening. It is possible that the initial contact at the screening event along with the follow-up contact was a sufficient stimulus to support health behavior change in those who indicated the screening as a motivating event. Thus, the strength of screening events as interventions for motivating behavior change may be increased if clients know that a contact will be made in the future to assess

whether change has been initiated. Further investigation is needed to determine the long-term effectiveness that screening events have on the sustainability of behavior changes, and whether self-reported behavior change can be corroborated through in-person follow-up with clinical assessments.

In summary, the results of this project indicated that screening and education events in rural communities can serve as an intervention to motivate changes in behaviors known to influence diabetes risk, and for those with diabetes, self-management behaviors. Rural providers interested in promoting behavior change in rural residents may find screenings a useful tool not only to detect undiagnosed disease, but also as a medium for communicating with rural residents about health behavior change.

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Table 1. Demographic characteristics of participants at screening (n = 78). Values represent percentages.

Female/Male Ratio	60/40			
Race				
	Caucasian	92		
	Native American	1		
	Hispanic/Latino	3		
	Asian	2		
	Other	2		
Participants with Diabetes	10			
Sibling with Diabetes	14			
Parent with Diabetes	34			
Percent of participants referred to provider	5			
Medical Conditions				
	Heart Disease	17	Heart Attack	4
	Stroke	8	Thyroid Condition	18
	Chronic Bronchitis	5	Asthma	12
	Hay Fever	21	Diverticulitis	4
	Rectal Polyps	9	Hypertension	41
	Hyperlipidemia	37	Kidney Disease	4
	Bladder Disease	1	Hepatitis	1
	Stomach Ulcer	7	Arthritis	38
	Prostate Condition	10	Abnormal Pap Smear	6
	Cancer	7	Osteoporosis	11
Self-reported General Health				
	Excellent	14		
	Very Good	30		
	Good	44		
	Fair	10		
	Poor	1		
Weekly exercise intense enough to sweat	51			
Read food labels and look for low-fat options	72			
Smoke or use smokeless tobacco	19			
Proportion of smokers who tried to quit in past year	58			

Table 2. Means and standard deviations for various measures obtained on participants at the screening.

	Mean	Standard Deviation
Age	56.4	15.5
Days of Exercise per Week	3.6	2.3
Minutes of Exercise per Day	62.9	95.6
Systolic Blood Pressure (mmHg)	128.8	18.2
Diastolic Blood Pressure (mmHg)	79.5	11.3
Casual Blood Glucose (mg / dL)	103.9	22.0
Body Mass Index	28.1	5.4
Diabetes Risk Test Score	8.4	4.0

Table 3. Percentages of participants with diabetes (n = 8) at initial screening who reported receiving routine tests and recommended prophylactic procedures.

HbA1c test in past 6 months	50
Foot examination by medical provider in past 12 months	86
Dilated eye examination in past 12 months	75
Received influenza vaccination in past 12 months	13
Received pneumonia vaccination at least once in lifetime	75
Take aspirin each day	86

Table 4. Percentages of responses at follow-up screening to statements about whether the screening motivated health behavior change. SA = strongly agree, A = agree, D = disagree, SD = strongly disagree, ADS/APT = already doing so, or already planned to. Percentages for SA to SD are based only on those respondents who were not already engaged in the behavior or who had already planned to engage in the behavior.

	SA	A	D	SD	ADS/APT
Motivation to exercise more	12	46	39	5	24
Motivation to watch dietary habits	12	70	16	2	19
Motivation to obtain flu vaccination	3	5	80	13	19
Motivation to obtain a pneumonia vaccination	2	5	79	14	7
Motivation to stop tobacco use (tobacco users only)	0	40	50	10	0

Table 5. Percentages of responses at follow-up screening from participants with diabetes (n = 5) to statements about whether the screening motivated health behavior change. SA = strongly agree, A = agree, D = disagree, SD = strongly disagree, ADS/APT = already doing so, or already planned to. Percentages for SA to SD are based only on those respondents who were not already engaged in the behavior or who had already planned to engage in the behavior.

	SA	A	D	SD	ADS/APT
Motivation to exercise more	0	80	20	0	0
Motivation to watch dietary habits	0	100	0	0	0
Motivation to obtain flu vaccination	0	25	75	0	20
Motivation to obtain a pneumonia vaccination	0	25	75	0	20
Motivation to stop tobacco use (tobacco users only)	0	50	50	0	0
Motivation to take diabetes medication on time	0	67	33	0	25
Motivation to obtain A1c test	33	0	67	0	40
Motivation to obtain foot examination	0	0	100	0	40
Motivation to obtain dilated eye examination	0	67	33	0	40
Motivation to take aspirin daily	0	67	33	0	40
Motivation to check blood sugar more often	0	75	25	0	20

Appendix 1. Intake survey conducted at screening.

Age: ___ Gender: ___Male ___Female I am currently pregnant: __Yes __ No

Race: _____ Hispanic/Latino
 ___Caucasian _____ Pacific Islander
 ___ Native American _____ Other: _____
 ___ Asian
 ___ Black or African American

1. I am under 65 years of age AND I get little or no exercise.

- Yes
 No

2. I have a sister or brother with diabetes.

- Yes
 No

3. I have a parent with diabetes.

- Yes
 No

4. I am a woman who has had a baby weighing more than 9 pounds at birth.

- Yes
 No

5. I do exercise during the week that causes me to break a sweat.

- Yes
 No

If you answered *yes* to Question 5, please answer the next 2 questions. If you answered *no*, please skip to question 6:

5A. In a typical week, how many days a week do you exercise? _____

5B. On average, how many minutes a day do you exercise? _____

6. I read food labels and look for low fat options.

- Yes
 No

7. I smoke or use smokeless tobacco.

- Yes
 No

If yes –

7A. I have tried to quit smoking in the last year

- Yes
 No

8. I last ate or drank _____ hours ago.

9. In the past, my health care provider has told me that I do have or have had:

	Yes	No		Yes	No
Heart Disease	___	___	Kidney Disease	___	___
Heart Attack	___	___	Bladder Disease	___	___
Thyroid Condition	___	___	Liver Cirrhosis	___	___
Stroke	___	___	Hepatitis	___	___
Tuberculosis	___	___	Stomach Ulcers	___	___
Chronic Bronchitis	___	___	Arthritis	___	___
Asthma	___	___	Prostate Trouble	___	___
Hay Fever (allergies)	___	___	Abnormal Pap Smear	___	___
Diverticulosis	___	___	Cancer	___	___
Rectal/colon Polyps	___	___	Chronic Colitis	___	___
High Blood Pressure	___	___	Osteoporosis	___	___
High Cholesterol	___	___			

10. In general, I feel my health is:

- Excellent
- Very Good
- Good
- Fair
- Poor

11. My health care provider has told me that I have diabetes.

- Yes
- No

If you answered *yes* to Question 11, please answer the following questions. If you answered *no*, you should not complete the questions below.

12. I take the following medications to treat my diabetes (check all that apply):

- Insulin
- Oral medications
- No medications

13. I have had an A1C test done in the last 6 months.

- Yes
- No

14. I have had a foot exam by a medical provider in the last 12 months.

- Yes
- No

15. I have had a dilated eye exam by a medical provider in the last 12 months.

- Yes
 No

16. I have had a flu shot within the past 12 months.

- Yes
 No

17. I have had a vaccine against pneumonia at least once in my lifetime.

- Yes
 No

18. I take aspirin each day.

- Yes
 No

19. In a typical week, I check my blood sugar on this many days:

- | | |
|----------------------------|----------------------------|
| <input type="checkbox"/> 1 | <input type="checkbox"/> 5 |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 6 |
| <input type="checkbox"/> 3 | <input type="checkbox"/> 7 |
| <input type="checkbox"/> 4 | |

Appendix 2. Follow-up survey for participants not referred to provider

Thank you for participating in our Diabetes Screening and Follow-up study. When you went through our health screen about 3 months ago, you signed a consent form to allow us to contact you again to ask a few question about your current health.

We would like to gather some information about your health since we last met you 3 months ago. Once we receive your survey, you will be finished with the study. All information collected will be kept confidential. It will be kept in locked files that can only be opened by Lisa Woodard and research assistants. Study results will be reported only as part of a larger group and not individually identifiable.

We thank you for taking the time to fill out and return the survey. If you have any questions about the survey or about your participation in the study, please call Lisa Woodard, faculty in the WSU College of Pharmacy at 509-XXX-XXXX. You may also contact a member of the Washington State University Institutional Review Board at 509-XXX-XXXX or irb@wsu.edu if you have questions about your rights as a study participant. This study has been review and approved for human subject participation.

Please answer all of the following questions based on your current health and activities by putting an 'X' on the line. If there are questions of the survey that you prefer not to answer you may leave them blank.

1. In the last 3 months, my health care provider has told me that I do or have had:

	Yes	No		Yes	No
Heart Disease	___	___	Kidney Disease	___	___

Heart Attack	—	—	Bladder Disease	—	—
Thyroid Condition	—	—	Liver Cirrhosis	—	—
Stroke	—	—	Hepatitis	—	—
Tuberculosis	—	—	Stomach Ulcers	—	—
Chronic Bronchitis	—	—	Arthritis	—	—
Asthma	—	—	Prostate Trouble	—	—
Hay Fever (allergies)	—	—	Abnormal Pap Smear	—	—
Diverticulosis	—	—	Cancer	—	—
Rectal/colon Polyps	—	—	Chronic Colitis	—	—
High Blood Pressure	—	—	Osteoporosis	—	—
High Cholesterol	—	—			

2. In general, I feel my health is:

- Excellent
- Very Good
- Good
- Fair
- Poor

3. I do exercise during the week that causes me to break a sweat.

- Yes
- No

If you answered *yes*, answer Questions 3A and 3B. If you answered *no*, skip to Question 4:

3A. In a typical week, how many days a week do you exercise? _____

3B. On average, how many minutes a day do you exercise? _____

4. Information from the health screening 3 months ago motivated me to exercise more.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Already doing so

5. I read food labels and look for low fat options.

- Yes
- No

6. Information from the health screening 3 months ago motivated me to watch my diet.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Already doing so

7. I smoke or use smokeless tobacco.

- Yes
- No

If you answered *yes*, answer Questions 7A and 7B. If you answered *no*, skip to Question 8.

7A. I have tried to quit smoking in the last 3 months

- Yes
- No

7B. Information from the health screening 3 months ago motivated me to try quitting.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

8. I had a flu shot within the last 3 months or am scheduled to have one.

- Yes
- No

9. Information from the health screening 3 months ago motivated me to get a flu shot.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Already planned to

10. I had a vaccine against pneumonia in the last 3 months or am scheduled to have one.

- Yes
- No

11. Information from the health screening 3 months ago motivated me to get a pneumonia vaccine.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Already planned to

12. Please check all of the types of health insurance you use to cover your medical bills.

- Medicare
- Medicaid or other DSHS
- Medical Assistance Administration (MAA) programs
- Employer or union provided health insurance
- Military health insurance
- Washington State's Basic Health Plan
- Health insurance bought on your own
- Covered by a plan provide by a person outside my household
- Covered by other health plans
- I am not currently covered by a health insurance plan

13. If you are not covered by health insurance, what is the main reason? (please check only one)

- I can't afford health insurance or it is too costly
- It is not needed because I'm healthy
- Existing plans won't cover my conditions
- Plans are not available to me
- I don't know where to get insurance
- I don't believe in insurance
- I have been declined
- The waiting list is long
- I am not working
- I have not bothered to enroll
- I am in between coverage
- I did not work long enough to get it
- I lost my job
- I lost my coverage
- I am in the waiting period

Appendix 3. Follow-up survey for participants referred to a provider

Thank you for participating in our Diabetes Screening and Follow-up study. When you went through our health screen about 3 months ago, you signed a consent form to allow us to contact you again to ask a few question about your current health.

We would like to gather some information about your health since we last met you 3 months ago. Once we receive your survey, you will be finished with the study. All information collected will be kept confidential. It will be kept in locked files that can only be opened by Lisa Woodard and research assistants. Study results will be reported only as part of a larger group and not individually identifiable.

We thank you for taking the time to fill out and return the survey. If you have any questions about the survey or about your participation in the study, please call Lisa Woodard, faculty in the WSU College of Pharmacy at 509-XXX-XXXX. You may also contact a member of the Washington State University Institutional Review Board at 509-XXX-XXXX or irb@wsu.edu if you have questions about your rights as a study participant. This study has been review and approved for human subject participation.

Please answer all of the following questions based on your current health and activities by putting an 'X' on the line. If there are questions of the survey that you prefer not to answer you may leave them blank.

1. In the last 3 months, my health care provider has told me that I do or have had:					
	Yes	No		Yes	No
Heart Disease	___	___	Kidney Disease	___	___
Heart Attack	___	___	Bladder Disease	___	___
Thyroid Condition	___	___	Liver Cirrhosis	___	___
Stroke	___	___	Hepatitis	___	___
Tuberculosis	___	___	Stomach Ulcers	___	___
Chronic Bronchitis	___	___	Arthritis	___	___
Asthma	___	___	Prostate Trouble	___	___
Hay Fever (allergies)	___	___	Abnormal Pap Smear	___	___
Diverticulosis	___	___	Cancer	___	___
Rectal/colon Polyps	___	___	Chronic Colitis	___	___
High Blood Pressure	___	___	Osteoporosis	___	___
High Cholesterol	___	___			

2. In general, I feel my health is:

- Excellent
- Very Good
- Good
- Fair
- Poor

3. I do exercise during the week that causes me to break a sweat.

- Yes
- No

If you answered Yes, answer Questions 3A and 3B. If you answered No, skip to Question 4:

3A. In a typical week, how many days a week do you exercise? _____

3B. On average, how many minutes a day do you exercise? _____

4. Information from the health screening 3 months ago motivated me to exercise more.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Already doing so

5. I read food labels and look for low fat options.

- Yes
- No

6. Information from the health screening 3 months ago motivated me to watch my diet.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree
- Already doing so

7. I smoke or use smokeless tobacco.

- Yes
- No

If you answered *yes*, answer Questions 7A and 7B. If you answered *no*, skip to Question 8.

7A. I have tried to quit smoking in the last 3 months

- Yes
- No

7B. Information from the health screening 3 months ago motivated me to try quitting.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

8. Please check all of the types of health insurance you use to cover your medical bills.

- Medicare
- Medicaid or other DSHS
- Medical Assistance Administration (MAA) programs
- Employer or union provided health insurance
- Military health insurance
- Washington State's Basic Health Plan
- Health insurance bought on your own
- Covered by a plan provide by a person outside my household
- Covered by other health plans
- I am not currently covered by a health insurance plan

9. If you are not covered by health insurance, what is the main reason? (please check only one)

- I can't afford health insurance or it is too costly
- It is not needed because I'm healthy
- Existing plans won't cover my conditions
- Plans are not available to me
- I don't know where to get insurance
- I don't believe in insurance
- I have been declined
- The waiting list is long
- I am not working
- I have not bothered to enroll
- I am in between coverage
- I did not work long enough to get it
- I lost my job
- I lost my coverage
- I am in the waiting period

10. After the screening that took place 3 months ago, did you see a health care provider for diabetes testing?

- Yes
- No

If you answered Yes to Question 10, please answer the following questions. If you answered No, please put the survey in the envelope included with the survey and return the survey to us. Thank you for your participation.

11. I saw the following provider _____

12. The health care provider told me that I have diabetes.

- Yes
- No

If you answered Yes to Question 12, please answer the following questions. If you answered No, please put the survey in the envelope included with the survey and return the survey to us. Thank you for your participation.

15. I had a foot exam by a medical provider in the last 3 months or am scheduled to have one.

- Yes
- No

16. I had a dilated eye exam by a medical provider in the last 3 months or am scheduled to have one.

- Yes
- No

17. I had a flu shot within the last 3 months or am scheduled to have one.

- Yes
- No

18. I had a vaccine against pneumonia in the last 3 months or am scheduled to have one.

- Yes
 No

19. I take aspirin each day.

- Yes
 No

20. In a typical week, I check my blood sugar on this many days:

- | | |
|----------------------------|----------------------------|
| <input type="checkbox"/> 1 | <input type="checkbox"/> 5 |
| <input type="checkbox"/> 2 | <input type="checkbox"/> 6 |
| <input type="checkbox"/> 3 | <input type="checkbox"/> 7 |
| <input type="checkbox"/> 4 | |

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