2012

Lifestyle Medicine-Related Cardiovascular Risk Factor Changes in Employees Participating in a Pharmacist-Run Risk Reduction Program

Thomas L. Lenz

Nicole D. Gillespie

Michele A. Faulkner

Maryann Z. Skrabal

Jessica J. Skradski

See next page for additional authors

Lifestyle Medicine-Related Cardiovascular Risk Factor Changes in Employees Participating in a Pharmacist-Run Risk Reduction Program

Authors

Thomas L. Lenz, Nicole D. Gillespie, Michele A. Faulkner, Maryann Z. Skrabal, Jessica J. Skradski, Yongyue Qi, and Jessica C. Larson

Lifestyle Medicine-Related Cardiovascular Risk Factor Changes in Employees Participating in a Pharmacist-Run Risk Reduction Program

Thomas L. Lenz, PharmD; Nicole D. Gillespie, PharmD; Michele A. Faulkner, PharmD; Maryann Z. Skrabal, PharmD; Jessica J. Skradski, PharmD; Yongyue Qi; and Jessica C. Larson, PharmD Candidate
School of Pharmacy and Health Professions, Creighton University

Abstract
Cardiovascular disease (CVD) remains the leading cause of death among American adults accounting for approximately one-third of all deaths. It has been shown, however, that the actual causes of death are related to lifestyle behaviors such as tobacco use, poor diet and physical activity and alcohol consumption. A pharmacist-run employee health program, started in 2008, sought to lower CVD risk through the use of individualized lifestyle behavior programming, medication therapy management, and care coordination activities. Following one year of participation in the program, employee participants were shown to significantly increase exercise quantity (p < 0.001), fruit and vegetable consumption (p < 0.001), and decrease self-reported stress level (p = 0.006). The percentage of program participants simultaneously adherent to the recommended levels of exercise, combined fruit and vegetable intake and tobacco abstinence at one-year was 34.5% vs. 5.5% at baseline. This compares with only 5.1% of the U.S. population adherent to the same three behaviors. Pharmacists can positively impact healthy lifestyle behaviors when working in an employee health setting.

Approximately 82,600,000 Americans (more than 1 in 3) currently have one or more types of cardiovascular disease (CVD) making it the number one cause of death in the United States and accounting for one-third of all deaths.[1] Currently, CVD accounts for approximately 17% of the nation's health care expenditures.[2] The American Heart Association projects that by the year 2030, approximately 40.5% of the U.S. population will have some form of CVD.[2] Between 2010 and 2030 the direct and indirect health care costs associated with CVD are projected to increase by 200% and 61%, respectively.[2]

It is known that the pre-clinical factors that lead to clinical CVD (i.e. atherosclerosis) begin early in life and that potentially modifiable risk factors related to healthy behaviors can decrease the risk for CVD.[3] Primordial and primary prevention strategies related to a healthy lifestyle have been shown to be effective at decreasing CVD morbidity and mortality.[3] Adequate exercise, fruit and vegetable intake and tobacco cessation have all been shown to decrease CVD mortality by 20% to 30%.[4-6] Additionally, obtaining adequate sleep, consuming no more than moderate amounts of alcohol and managing stress may also have an effect on decreasing CVD morbidity and mortality.[7] The American Heart

Association has recently published a policy statement showing that it is cost effective to deliver lifestyle related interventions for primordial and primary prevention.[3]

Lifestyle medicine has been defined by the American College of Lifestyle Medicine as, "The use of lifestyle interventions in the treatment and management of disease."[8] Lifestyle interventions include proper nutrition, physical activity, tobacco cessation, stress management, sleep management, alcohol moderation, and others. These strategies are recommended in nearly every major chronic disease practice guideline as first line treatment.[9] The use of lifestyle medicine differs from conventional medicine in that it aims to prevent and treat the actual cause of disease, rather than treat the symptoms or complications.

In 2004, Mokdad et al, from the Centers for Disease Control and Prevention (CDC), published a study comparing the expected leading causes of death in the U.S. to the actual causes of death.[10] This study found that in 2000, the top three "causes of death" were heart disease, cancer and stroke. However, when looking at the "actual" reasons why Americans have these conditions, the study found the top reasons to be related to tobacco use, poor diet and physical inactivity and alcohol consumption.[10] In 2005, a study was published using data from the 2000 Behavioral Risk Factor Surveillance System (BRFSS) that showed among American adults without coronary heart disease, only 5.1% were simultaneously adherent to the recommended levels of exercise and fruit and vegetable consumption in addition to abstinence from smoking.[11]

Corresponding author: Thomas L. Lenz, PharmD
Associate Professor, Department of Pharmacy Practice
Creighton University, 2400 California Plaza
Omaha, Nebraska 68178, Phone: 402-280-3144
Fax: 402-280-3320, Email: tlenz@creighton.edu

The purpose of this analysis is to report the effect that a pharmacist can have on the lifestyle medicine-related behaviors at baseline versus one-year for employees with chronic conditions who participate in a pharmacist-run employee health risk reduction program. Prior to conducting the analysis, the project was submitted to the local Institutional Review Board for approval and oversight. The project was considered to be a continuous quality improvement measure of the employee risk reduction programs and therefore, oversight was deemed not necessary.

Methods

Risk Reduction Programs
In 2008, a medium sized university in the Midwestern section of the United States initiated a pharmacist-run employee health Cardiovascular and Diabetes Risk Reduction Program. Employees were eligible to volunteer for the program if they had an existing diagnosis of hypertension, hypercholesterolemia diabetes mellitus, or a combination, thereof. Employees could participate in the program for as long as they remained employed with the university and obtained their health care benefits from the employer. The primary outcomes of the program were to (1) reduce the risk of experiencing a cardiovascular event within the next 10 years; (2) improve the lifestyle habits of physical activity, healthy eating, stress management, sleeping, alcohol consumption, and tobacco use; (3) improve medication adherence; (4) improve quality of life; and (5) improve presenteeism (productivity) rates.

Participants in the risk reduction programs attended one-on-one appointments with the pharmacist at least one time per month. Monthly visits consisted of medication therapy management activities, implementation and adherence to seven personalized lifestyle medicine programs (physical activity, healthy eating, stress management, restorative sleep, moderate alcohol consumption, tobacco abstinence/cessation, and weight control), and chronic disease care coordination practices. Information regarding the care coordination practices within the program has been previously published.[12]

In order to achieve the highest level of program adherence and success, each participant was provided with educational materials, a home blood pressure monitor, a pedometer, lifestyle behavior tracking tools, free access to the employers exercise facilities, monthly support group meetings, and access to a licensed mental health care provider. Additionally, the employees with diabetes were provided with an initial consultation with a dietitian, six hours of American Diabetes Association approved education classes, and access to point-of-care hemoglobin A1c analyses as needed. Information regarding the interprofessional nature of the program and

responsibilities of each care provider has been previously published.[13]

Individual participant data was recorded in a database at baseline and annually thereafter. Collected data consisted of cholesterol, blood pressure, and blood glucose lab values, body weight, lifestyle medicine behavior activities, medication refill records, health related quality of life (HRQOL) questionnaires, and presenteeism questionnaires. With the permission from the participant, additional health information was also obtained from the annual health risk appraisal data collected by the employer and/or from the participant's other health care professionals (ie. physician).

Lifestyle Medicine Behaviors Analysis
Participation in the risk reduction program was free to employees who met the program qualifications. However, in order to retain the program benefits, participants were required to use a lifestyle medicine adherence tracking journal on a daily basis.[14] Participants were required to bring their journal to each appointment with their pharmacist to improve accountability and monitor program adherence.

The journal was organized in such a way that allowed for participants to write their weekly goals related to lifestyle medicine and disease management. In addition, on a daily basis participants recorded the following information in their journal:
- type, intensity and quantity of physical activity (minutes per day)
-quantity of combined fruit and vegetables (servings per day)
-quantity of sleep (hours per night)
-quantity of alcoholic drinks (drinks per day)
-overall daily stress rating using the following instructions and

5 point scale:
"Stress can change throughout the course of a day. Think about your overall stress level today taking into consideration the high stress and low stress moments. On a scale from 1 (low stress) to 5 (high stress) how would you rate your overall stress level today?"

1   Low Stress (feeling calm and in control)
2
3   Moderate Stress
4
5   High Stress (feeling frantic and out of control)

Additionally, tobacco use was assessed and recorded on a monthly basis through conversations with the pharmacist.

On a monthly basis during the one-on-one appointments, the journal was reviewed by the pharmacist and an average of the previous 30 days of lifestyle medicine activities listed above was recorded in the participant's chart. On an annual basis, the lifestyle medicine behaviors listed above were recorded in a database along with additional program data previously documented. The lifestyle medicine-related data entered in the database was an average of that recorded for the 30 days prior to the participant's anniversary appointment. Additionally, when an employee was initially enrolled in the program, they were interviewed by the pharmacist to obtain information about their participation in the lifestyle medicine behaviors listed above during the previous 30 days prior to program enrollment. These data were also entered into the database as baseline lifestyle medicine-related behaviors.

For the purposes of this analysis, the lifestyle medicine behavior data of exercise participation, combined fruit and vegetable consumption, tobacco use, alcohol consumption, sleep quantity, and overall stress rating recorded at baseline was then compared with data recorded at one year. It should be noted that the quantity of exercise reported in this analysis includes "purposeful exercise" regardless of intensity. "Purposeful exercise" was defined for the participants as "physical activity that is sustained for at least 10 minutes, increases heart rate and breathing rate, and is performed for the purposes of exercise." Participants were also asked to record their "extra physical activity" obtained via activities of daily living such as parking further away in a parking lot, walking the dog, and taking the stairs. This information was only recorded in the journal as either "yes" or "no" for each day and was not included in this analysis. It should be further noted that fruit and vegetable consumption was recorded as combined daily servings and not as separate values.

Participants
The data reported in this analysis consists of the employees who participated in the Cardiovascular and Diabetes Risk Reduction Program and had matching lifestyle medicine data at both baseline and at one year. The number of matching data points is different among the lifestyle medicine activities due to missing or unavailable data at the time of data collection. The specific *n* for each activity ranges from 31 to 54, and is clearly marked throughout the tables within this analysis.

Statistical Analysis
The statistical analysis for this project used the Wilcoxon signed-rank test as a non-parametric test to compare the median difference between the two time points. A p value of <0.05 was considered statistically significant. Descriptive analyses were also used to compare the number and

percentage of employees participating in each of the lifestyle medicine activities.

Results
From August 2008 through May 2012 a total of 80 employees were enrolled in the risk reduction program. Of these individuals, 63 (19 male / 44 female) completed at least one year of participation and had matching lifestyle medicine data collected at baseline and at one year.. The average age of the participants at enrollment was 52.2 years with 40 having an existing diagnosis of hypertension, 46 having hyperlipidemia and 23 having diabetes mellitus type 2. The lifestyle medicine data was analyzed for the group as a whole as well as separately for those with and without diabetes.

Table 1 compares baseline data for exercise, combined fruit and vegetable consumption, sleep quantity and stress rating to that recorded after participating for one year in the risk reduction program. The one-year results showed that overall, the group demonstrated a significant increase in the amount of exercise (p < 0.001) and fruit and vegetable consumption (p < 0.001), as well as a decrease in self-reported stress (p = 0.006) compared with baseline. No statistically or clinically significant difference was observed with regards to the quantity of sleep participants received at baseline versus one year.

The diabetes subgroup demonstrated improvements in all four lifestyle medicine activities listed in Table 1, but showed statistical improvement with only the combined fruit and vegetable consumption activity (p < 0.012). A relative increase of 90% was demonstrated with the amount of exercise performed each week in this group but was not statistically significant (p = 0.062). The number of individuals included in this analysis was relatively small (*n* = 11-16) which may have underpowered the analysis to show statistically significant changes.

The non-diabetes subgroup results were similar to that of the overall group showing statistical changes in the exercise (p < 0.001), combined fruit and vegetable (p < 0.001), and stress rating (p = 0.002) activities, but not with regard to sleep quantity (p = 0.138). The number of participants was greater in this subgroup compared with the diabetes subgroup, which suggests that overall, the group data was largely positive due to the outcomes of the non-diabetes subgroup.

Among the 63 individuals who completed at least one year of the risk reduction program, only three employees smoked at baseline (2 of 3 in diabetes subgroup). After one year in the program one of the three employees who smoked successfully quit. There were not enough individuals who smoked tobacco to include this activity in the statistical analysis.

Likewise, there were not enough employees who drank alcohol to conduct a statistical analysis. However, analyzing the data descriptively showed that only one employee consumed greater than moderate amounts of alcohol and did so at both baseline and at one-year. The average number of drinks consumed by this female employee was two per day (one drink/day is considered moderate intake for women).[7]

Table 2 demonstrates the percentage of employees who achieved the recommended amounts of physical activity and combined fruit and vegetable consumption at baseline versus one-year. The overall group, as well as each subgroup, showed an increase in the percentage of risk reduction participants who were achieving the recommended amounts. In addition, the percentage of employees achieving the recommended amounts of physical activity and combined fruit and vegetable consumption at one-year exceeded that reported for the general adult U.S. population. This was also true when looking at each subgroup separately. It should be noted that the general U.S. population statistics included adults with and without chronic conditions, and that our analysis included only individuals with one or more chronic conditions.

The recommended amount of sleep for adults ranges from 7 to 9 hours per night.[7] When looking at the percentage of employees who reported getting less than 7 hours per night, the data showed improvements for the overall group as well as for each subgroup. At baseline, 40% (16/40) of the overall group was getting less than 7 hours of sleep per night compared with 30% (12/40) at one-year. The diabetes subgroup reported 44.4% (8/18) at baseline and 38.9% (7/18) at one-year. The non-diabetes group reported 36.4% (8/22) at baseline and 22.7% (5/22) at one-year. This compares to national data where 35.3% of U.S. adults report getting less than 7 hours of sleep per night.[15] Not enough employees used tobacco or alcohol to perform a descriptive analysis as done with physical activity, fruit and vegetable intake and sleep quantity. Additionally, the stress rating tool used in the risk reduction programs does not allow for this type of analysis.

Figure 1 also shows the percentage of employee participants who are achieving the recommended amounts of multiple lifestyle medicine activities at the same time. This analysis looked at each employee's ability to achieve the recommended amounts of physical activity, combined fruit and vegetable consumption along with tobacco abstinence simultaneously. The results show that the percentage of the overall group increased from 5.5% to 34.5% with a similar increase demonstrated in each subgroup. Of note is the comparability of the individuals included in this analysis at

baseline with that reported for the general U.S. population, 5.5% vs. 5.1%, respectively.[11]

Discussion
Our analysis shows that a pharmacist-run risk reduction program conducted in an employee health setting for individuals with chronic conditions can significantly improve lifestyle medicine-related cardiovascular risk factors after one year of participation. It has been shown that the most prevalent "actual causes of death" in Americans are related to tobacco use, poor nutrition and physical inactivity.[10] Previous research has shown that tobacco cessation, adequate fruit and vegetable consumption, and adequate amounts of exercise can each lower CVD risk by 20% to 30%.[4-6] Our data show-that after one year of participation, over one-third of participant employees were simultaneously achieving the recommended levels of all three of these lifestyle medicine activities, compared with only 5% of the general U.S. population. Lifestyle medicine aims to prevent and treat the actual cause of disease, and our data demonstrate that the risk reduction programs may be having a positive impact on this endeavor.

In addition to the quantitative lifestyle medicine data presented in this analysis, we conducted a focus group session with eight participants to obtain additional qualitative information. When participants were asked about lifestyle medicine activity improvements related to the programs, responses overwhelmingly favored the one-on-one meetings with a pharmacist as the most important aspect of the program that helped them reach their goals as related to lifestyle medicine. Participants articulated that the pharmacists were accessible, held them accountable to their individual program and provided necessary motivation and frequent practical advice.

It may be untraditional to think of a pharmacist using lifestyle medicine to prevent and treat diseases. Most all health care providers, including pharmacists, work with patients who have one or more chronic conditions. Interestingly, the treatment guidelines for the management of the most common chronic conditions, such as hypertension, dyslipidemia, coronary heart disease, diabetes, obesity and many others list lifestyle medicine-related strategies as first-line therapy.[9] An argument can be made that in order for pharmacists to best help patients manage their chronic conditions, they should be counseling about both drug therapy and lifestyle medicine strategies. In fact, lifestyle medicine is an area that cross-cuts almost all healthcare professions and therefore, nearly all healthcare professionals could be talking with their patients about lifestyle medicine.

It may also be untraditional to think of a pharmacist working in a setting that does not involve the dispensing of medications. The employee health setting may offer pharmacists an excellent professional opportunity to use their skills in the absence of a medication dispensing role. The data presented in this manuscript come from a pharmacist-run employee health program that does not involve the dispensing of medications. The role of the pharmacist in this program is to emphasize medication therapy management, lifestyle medicine and care coordination activities to improve the health and well-being of an employee population. In order to conduct a program such as this, a pharmacist may need to receive additional training in the areas of lifestyle medicine and care coordination. This training could be obtained formally in school, as well as through additional training after graduation. Other opportunities for pharmacists in the employee health setting may include educating employees on medical self-care topics, working with the employer on their drug formulary, and providing immunizations to employees.

More research and analysis is required in order to gain additional understanding of how a pharmacist can affect lifestyle medicine-related cardiovascular risk factors. Pharmacists working in a community pharmacy setting may also be able to incorate lifestyle medicine programs to improve the health and well-being of their patients. Not only do pharmacists have frequent exposure to individuals with chronic conditions on a daily basis, but they are also easily accessible healthcare providers, making them a valuable resource for the community regarding lifestyle medicine activities. Pharmacists may be able to effectively provide counseling for both medication use and lifestyle modifications when dispensing medication in a community pharmacy setting.

Our analysis did contain a number of limitations that should be mentioned. The number of participants was small, and the overall analysis time period was short. One of the main goals of the risk reduction program is to decrease the long-term risk for experiencing a cardiovascular event. Although the data presented in this analysis are encouraging, additional long-term data on more employees are needed to show lasting program success. Additionally, from its inception, this program was designed to be a self-sustaining employee health program and not a research study. As a result, the lifestyle medicine data collected is self-reported, and to some extent, from recall. The stress rating scale that is used in the program and reported in this manuscript is one that was designed specifically for the program. This tool does not have statistical validity but does, however, offer a great deal of clinical use and significance. Overall nutrition success is difficult to quantify, and this analysis only used fruit and vegetable intake

as an assessment of healthy eating. Each individual participant's nutrition assessments are gauged on many factors, but for simplicity in data collection and reporting, fruit and vegetable intake was used for this report. Also, many aspects related to sleep can affect an individual's health. Our analysis only reports the quantity of sleep obtained, and not the quality of sleep an individual is receiving.

Lastly, the comparison made between the individuals in this analysis and those included in the 2009 BRFSS survey regarding those who achieved all three healthy behaviors simultaneously should consider the fact that those in the BRFSS self-reported no chronic conditions. The individuals in our analysis included only individuals with at least one chronic medical condition, and therefore a direct comparison cannot be made. Also, the criteria the BRFSS questionnaire used for achieving adequate exercise was $\geq$150 minutes/week of moderate or $\geq$60 minutes/week of vigorous exercise, and our program used $\geq$150 minutes/week of moderate or $\geq$75 minutes/week of vigorous exercise. Our criteria were more stringent making this comparison more conservative. The percentage of individuals in our program achieving all three healthy activities may have been greater if we had used $\geq$60 minutes/week of vigorous activity as in the 2009 BRFSS.

Conclusion

Cardiovascular disease remains the leading cause of death among Americans. However, these deaths are related to lifestyle behaviors, such as tobacco use, poor nutrition and physical inactivity. Our data show that a pharmacist can have a positive impact on the lifestyle medicine-related cardiovascular risk factors that can lead to CVD. These positive changes were observed when looking at individual lifestyle medicine activities, as well as the ability to successfully participate in multiple activities at the same time. Pharmacists may be able to positively impact employee health by performing services that are unrelated to medication dispensing. More programs and research related to pharmacists working in this setting are needed to reinforce the positive outcomes presented in this manuscript. The pharmacist's role in promoting lifestyle medicine activities has great potential in many different pharmacy practice settings.

References

1. Roger VL, Go AS, Lloyd-Jones DM, Benjamin EJ, Berry JD, Borden WB, Bravata DM, Dai S, Ford ES, Fox CS, Fullerton HJ, Gillespie C, Hailpern SM, Heit JA, Howard VJ, Kissela BM, Kittner SJ, Lackland DT, Lichtman JH, Lisabeth LD, Makuc DM, Marcus GM, Marelli A, Matchar DB, Moy CS, Mozaffarian D, Mussolino ME, Nichol G, Paynter NP, Soliman EZ, Sorlie PD, Sotoodehnia N, Turan TN, Virani SS, Wong ND, Woo D, Turner MB; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. *Circulation.* 2012;125:e2–e220.

2. Heidenreich PA, Trogdon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, Finkelstein EA, Hong Y, Johnston SC, Khera A, Lloyd-Jones DM, Nelson SA, Nichol G, Orenstein D, Wilson PWF, Woo YJ; on behalf of the American Heart Association Advocacy Coordinating Committee, Stroke Council, Council on Cardiovascular Radiology and Intervention, Council on Clinical Cardiology, Council on Epidemiology and Prevention, Council on Arteriosclerosis, Thrombosis and Vascular Biology, Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation, Council on Cardiovascular Nursing, Council on the Kidney in Cardiovascular Disease, Council on Cardiovascular Surgery and Anesthesia, and Interdisciplinary Council on Quality of Care and Outcomes Research. Forecasting the future of cardiovascular disease in the United States: a policy statement from the American Heart Association. *Circulation.* 2011;123:933–944.

3. Weintraub WS, Daniels SR, Burke LE, Franklin BA, Goff DC Jr, Hayman LL, Lloyd-Jones D, Pandey DK, Sanchez EJ, Schram AP, Whitsel LP; on behalf of the American Heart Association Advocacy Coordinating Committee, Council on Cardiovascular Disease in the Young, Council on the Kidney in Cardiovascular Disease, Council on Epidemiology and Prevention, Council on Cardiovascular Nursing, Council on Arteriosclerosis, Thrombosis and Vascular Biology, Council on Clinical Cardiology, and Stroke Council. Value of primordial and primary prevention for cardiovascular disease: a policy statement from the American Heart Association. *Circulation.* 2011;124:967–990.

4. Golbidi S, Laher I. Exercise and the cardiovascular system. Cardiology Research and Practice. 2012;Article ID 210852: 15 pages. doi:10.1155/2012/210852.

5. Bazzano LA, He J, Ogden I.G., et al. Fruit and vegetable intake and risk of cardiovascular disease in US adults: the first National Health and Nutrition Examination Survey Epidemiological Follow-Up Study (NHANES). Am J Clin Nutr. 2002; 76: 93-9.

6. Centers for Disease Control and Prevention. Smoking and Second Hand Smoke: Impact on Heart Disease and Stroke. Available at: http://www.cdc.gov/tobacco/campaign/tips/resources/overviews/heart-disease-stroke.html. Accessed on: August 6, 2012.

7. Lenz TL. Lifestyle Modifications in Pharmacotherapy. Lippincott, Williams, and Wilkins. Baltimore. 2008. ISBN-13: 978-0-7817765-1-6

8. American College of Lifestyle Medicine. What is Lifestyle Medicine? Available at: http://www.lifestylemedicine.org/define. Accessed on August 6, 2012.

9. Lenz TL, Petersen K, Monaghan MS. Counseling patients about lifestyle modification. US Pharm. 2008;33(1):38-45.

10. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United Stated, 2000. JAMA 2004;291:1238-1245.

11. Miller RR, Sales AE, Kopjar B, Fihn SD, Bryson CL. Adherence to heart-healthy behaviors in a sample of the U.S. population. Prev Chronic Dis 2005 Apr;2(2):A18.

12. Lenz TL. The ambulatist: A health care professional specializing in lifestyle medicine for chronic disease care coordination. American Journal of Lifestyle Medicine. 2010;4(2):134-137.

13. Lenz TL, Gillespie ND, Skrabal MZ, Faulkner MA, Skradski JJ, Ferguson LA, Pagenkemper JJ, Jorgensen D. Using employee experts to offer an interprofessional diabetes risk reduction program to fellow employees. Journal of Interprofessional Care. 2012; Early online: 1-3. doi:10.3109/13561820.2012.721816

14. Lenz TL, Skradski J, Skrabal MZ, Ferguson L, Monaghan MS. A lifestyle medicine clinic in a community pharmacy setting. INNOVATIONS in pharmacy. 2010;1(1) Article 3:1-12.

15. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. BRFSS Annual Survey Data. 2009 Survey Data. Available at: http://www.cdc.gov/brfss/technical_infodata/surveydata/2009.htm. Accessed on: August 6, 2012.

Table 1. Change in the quantity of lifestyle medicine activities at baseline versus one-year.

Lifestyle Medicine Activity	Exercise, minutes/week	Combined Fruit & Vegetable, servings/day	Sleep, hours/night	Stress, rating*
	Baseline vs One-Year (actual / relative difference, p value)			
Overall**	68.2 vs 174.8 (+106 min/wk / +156%, p < 0.001)	3.1 vs 4.3 (+1.2 serv/day / 39%, p < 0.001)	7.0 vs 7.1 (+0.1 hrs/night / +1.4%, p = 0.109)	3.2 vs 2.5 (-0.7 / -22% p = 0.006)
Diabetes†	44.0 vs 83.4 (+39.4 min/wk / +90%, p = 0.062)	3.2 vs 4.1 (+0.9 serv/day / +28%, p = 0.012)	6.8 vs 7.1 (+0.3 hrs/night / +4.4%, p = 0.564)	3.1 vs 2.8 (-0.3/ -10% p = 0.565)
Non-Diabetes‡	75.2 vs 215.4 (+140.2 min/wk / +186%, p < 0.001)	2.8 vs 4.4 (+1.6 serv/day / +57%, p < 0.001)	7.0 vs 7.1 (+0.1 hrs/night / +1.4%, (p = 0.138)	3.3 vs 2.4 (-0.9 / -27% p = 0.002)

*Stress: Overall daily stress was self-rated on a 1-5 scale as follows: 1=Low Stress (feeling calm and in control), 2, 3=Moderate Stress, 4, 5 High Stress (feeling frantic and out of control)
**n for exercise, fruit and vegetable, sleep, stress is 52, 55, 41, and 31, respectively
† n for exercise, fruit and vegetable, sleep, stress is 16, 19, 18, 11, respectively
‡ n for exercise, fruit and vegetable, sleep, stress is 36, 36, 23, 20, respectively

Table 2. Percentage of employees at goal for physical activity and fruit/vegetable consumption.

Lifestyle Medicine Activity*	Baseline, %	One-Year, %	National Data, %
Physical Activity			
Overall	24.1 (13/54)	53.7 (29/54)	50.6**
Diabetes	11.1 (2/18)	38.9 (7/18)	No data
Non-Diabetes	30.6 (11/36)	61.1 (22/36)	No data
Combined Fruit & Vegetable Consumption			
Overall	16.7 (9/54)	37.0 (20/54)	23.5**
Diabetes	15.8 (3/19)	36.8 (7/19)	No data
Non-Diabetes	17.1 (6/35)	37.1 (13/35)	No data

*Physical Activity Goal: ≥150 min/wk of moderate or ≥75 min/wk of vigorous intensity or combination; Combined Fruit & Vegetable Goal: ≥5 servings/day
**Reference #15

Figure 1. Percentage of employee participants vs. percentage of the general U.S. population achieving recommended amounts of exercise, fruit and vegetable consumption and tobacco abstinence simultaneously.[11]