

# PROPOSAL FOR DIETARY INTERVENTION PROGRAM FOR EMPLOYEES OF CENTRASTATE MEDICAL CENTER:

## *Controlling Diabetes Through Plant-Based Diet*

TRACEY SALISKI, MA & ANTHONY DISSEN, MA, RDN

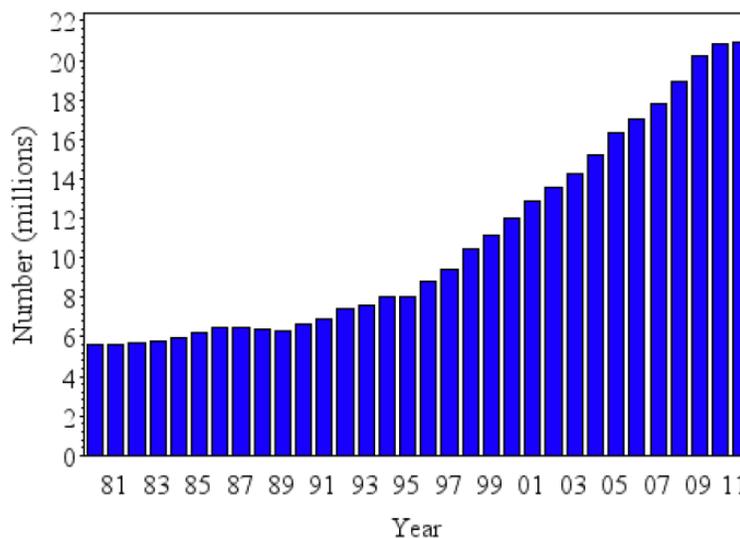
### Impact of Diabetes on Healthcare

Diabetes Mellitus (DM) is one of the most common chronic illnesses currently plaguing the United States. Nationally, the number of people diagnosed with diabetes has increased by a factor of nearly 4 in the last 30 years (Figure 1) and estimates indicate it will only continue to rise with time<sup>1</sup>. Within the state of New Jersey, current estimates place the number of individuals living with DM to be somewhere around 8.5% of the entire NJ population<sup>2</sup>, a more than 2-fold increase within the last 20 years.

Here within the CentraState Healthcare System employee population, 392 employees had diabetes related health claims or were either classified as being diagnosed with diabetes or had a high risk for diabetes from the HRA. This naturally places a huge financial burden upon the country as a whole, and any individual organization or business that has to pay for the healthcare costs and health insurance of its citizens/employees.

The American Diabetes Association (ADA) estimates that the 2012 cost within the United States for diabetes care fell within the realm of \$245 billion, a \$71 billion increase from 2007 estimates<sup>3</sup>. According to a claims analysis performed by WellNow, LLC. in June 2014, a High BMI (\$768 per member per month), Waist Circumference (\$772 pmpm), and Fasting Blood Sugar (\$779 pmpm) drove the highest claims within the CentraState population per member per month for both medical and prescription risk.

Figure 1. Number of Individuals/Year Diagnosed with Diabetes Mellitus



Therefore, this proposal aims to highlight the potential benefit of a whole food, plant-based diet for employees of CentraState Healthcare System who are currently diagnosed with DM as a way to better manage the condition, and potentially reduce the dependency on medications and produce other positive results. If followed longitudinally, it can be determined how this impacts other co-morbidities and biometric factors of employees with DM (blood pressure, blood lipids, pulse rate, etc.) as well as compare financial costs to CentraState for those employees who remain compliant with the dietary protocol.

## EVIDENCE TO SUPPORT PLANT-BASED DIET IN MANAGING DIABETES

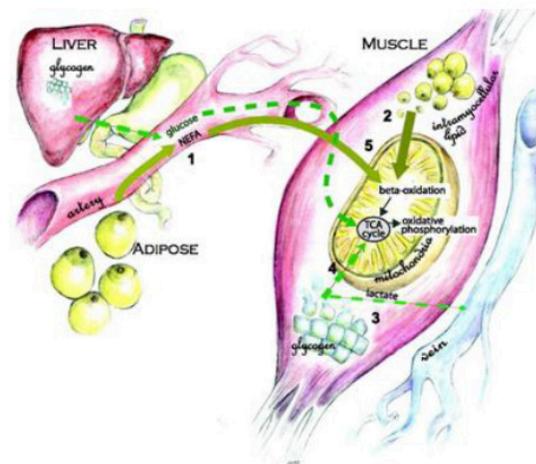
To provide a brief overview of the rationale behind DM management with a plant-based diet, it is important to understand the true pathophysiology behind DM, especially Type 2 DM. Unlike Type 1 DM, which is an autoimmune condition, Type 2 DM is almost entirely due to dietary and lifestyle habits and factors that lead the body to be resistant to the production of insulin. This condition of insulin resistance is the true culprit behind Type 2 DM, as it prevents the body's own cells from being able to absorb blood glucose derived from the foods consumed. The current paradigm surrounding DM management is to very intensely control blood glucose levels via limiting dietary carbohydrates and medications. However, studies have shown that this current approach does not consistently lead to increased health and decreased risk of early death<sup>4</sup>.

Within the last decade or so, we are seeing new research come forward that points to a different way of understanding this disease. Rather than viewing DM as a condition of blood sugar being high, at its core we understand that DM is a condition of the body becoming resistant to the functioning of insulin. So it is the treatment and reversal of this insulin resistance that gets to the heart of the condition, rather than trying to continually lower blood glucose levels, which is akin to treating the symptom versus the disease. The way in which the body becomes resistant to insulin appears to be predominantly due to the buildup of intramyocellular lipid (IML) within the cells and somatic tissue<sup>9</sup>. When these microscopic droplets of fat build up within the cells and tissues of the body, there is interference with the ability of insulin to properly connect to the appropriate cell receptors, leading to an inability of the insulin to do its work and a buildup of blood glucose ensues (Figure 2). Therefore, it would seem that any program working to manage/possibly reverse Type 2 DM would benefit from focusing on treating the insulin resistance rather than focus solely on blood glucose levels.

The effectiveness of plant-based diets for treating insulin resistance, especially when compared to our current dietary recommendations in the US, is well known and documented for its overall benefits<sup>6,7,8</sup>. A large meta-analysis and systemic review of the literature found that individuals utilizing a plant-based diet to manage their Type 2 DM had lower fasting blood glucose levels and lower HbA1c when compared to those consuming an omnivorous diet<sup>9</sup>. In fact, meat consumption in of itself has been found to be a risk factor for the development of Type 2 DM and insulin resistance<sup>10</sup>.

The benefits also appear to extend beyond the comparison to a traditional, standard American diet, but also when compared to a diet recommended by the ADA. A 2009 study found that individuals consuming a whole, low-

Figure 2. Presence of Fat Within Muscle Cells  
 (courtesy of Neal Barnard, MD)



fat, plant based diet had greater control of both glycemic levels as well as blood lipid levels when compared to the people following the ADA-approved diet<sup>11</sup>. A low-fat, plant based diet was also found to elicit greater positive changes in macronutrient intake when compared to the ADA diet<sup>12</sup>. Additionally, within this same study, it was found that those on the low-fat, plant based diet had comparable levels of acceptability and adherence as those on the more conventional diet, leading the researchers to conclude that advocating a plant-based diet would not have less compliance or adherence than those following a traditional ADA-style dietary plan.

In a 22-week comparison, those consuming the plant-based diet had greater Nutrient intake and Alternate Healthy Eating Index (AHEI) scores than those on the ADA diet, and also had greater intake in several key nutrients (fiber, total vitamin A activity, beta carotene, vitamins K and C, folate, magnesium, and potassium) than those in the ADA group<sup>13</sup>. It should be further noted that this study found that total carbohydrate intake actually increased in the low-fat, plant-based group, but still experienced these health benefits, leading further weight to the argument that DM management is not best served by focusing on the control/reduction of carbohydrate intake.

When looking into why these low-fat, plant based diets seem to offer such a benefit to insulin sensitivity and overall health status, research is beginning to understand how the body's utilization of calories and blood glucose is altered by such a change in dietary patterns. A 2013 study found that individuals following a vegan diet had significantly greater glucose disposal when compared to their omnivorous participants<sup>14</sup>. That is to say that the vegan participants' bodies were much more effective at utilizing and removing glucose from the bloodstream and converting it into "burned" calories than those consuming animal products.

Some studies suggest this may be due to the fact that vegans tend to have greater loss of visceral fat (the fat that builds up along muscle tissue and organs) than those consuming animal foods<sup>15</sup>. Improvements were also seen in the vegan group on oxidative stress markers, which would provide an overall protection to the body's tissues from damage and oxidation.

## ADDITIONAL HEALTH-RELATED BENEFITS TO A PLANT-BASED DIET

Diabetes, like so many other chronic illnesses, is not a condition that provides an isolated area of impact on one's health. Rather, there are several co-morbidities associated with DM including cardiovascular disease, renal disease, macular degeneration, and neuropathy to name a few. When looking at the research regarding plant-based diets and these co-morbidities to DM, we see similar benefits as to the condition of insulin resistance itself. Low-fat vegan diets have shown to have great benefit to cardiovascular health by lowering blood lipid levels, again, greater than those found in those following a typical ADA-style diet<sup>11,16</sup>. Risk of atherosclerosis also decreases for the low-fat vegan groups, and atherosclerosis has even been found to reverse on such a dietary program<sup>17, 18</sup>.

The typical components of a low-fat, plant-based diet (high intake of fiber, fruits, vegetables, whole grains, etc.) are also well known factors that reduce risk of metabolic syndrome, a condition approximately 25% of adults worldwide are thought to have<sup>19</sup>. Vegan diets have also been found to be of possible help in managing/preventing/reducing neuropathy in those with Type 2 DM by improving circulation through increased blood filterability and decreased blood viscosity<sup>20</sup>. This same study cites that vegan diets can reduce white blood cell count and lead to other improvements in circulatory and hematological health, especially when combined with physical exercise.

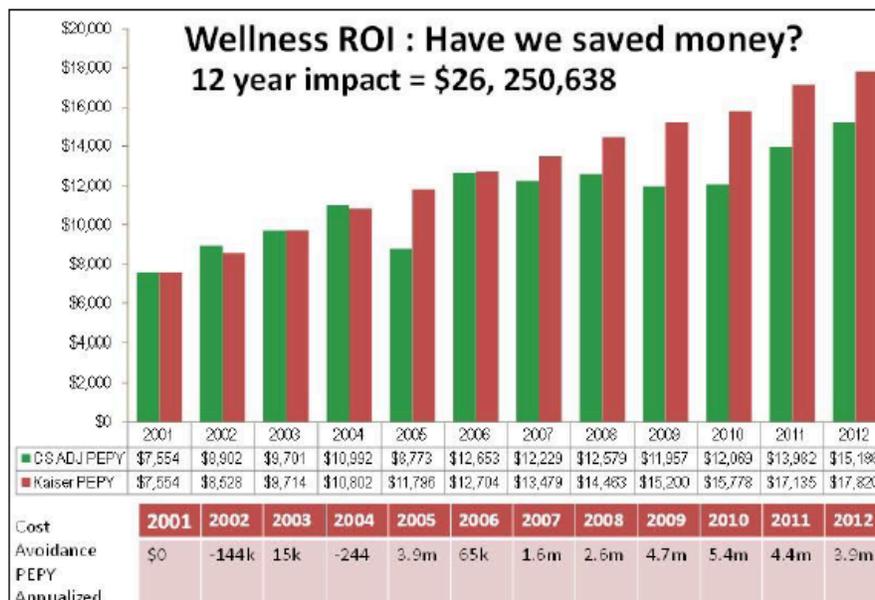
Lastly, it is important to note that in the majority of these studies, food consumption within the plant-based dietary groups was not restricted. That is to say, participants were encouraged to eat **ad libitum** throughout the course of the study from the list of approved foods/food groups. In fact, even just 7 days on an ad libitum,

low-fat, vegan diet has been shown to result in weight loss, drop in total cholesterol numbers, decrease in both systolic and diastolic blood pressure, and fasting blood glucose levels<sup>21</sup>. To be able to consume foods without fear of portion control or other restrictive states of mind can greatly enhance the likelihood of compliance, effectiveness, and overall enjoyment on such a dietary program.

## EFFECTIVENESS OF WORKPLACE WELLNESS PROGRAMS

CentraState Healthcare System's workplace wellness program has been in place since 2005. Built upon an annual Health Risk Assessment and Biometric Screening, Human Resources has been able to grow the Employee Wellness Program over the last ten years to include Work Groups, yearly fitness challenges, and various educational opportunities for employees. Its success can be shown in the graph below (Figure 3) documenting a substantial cost savings to the organization in the per employee per year cost for CentraState employees. CentraState has also received national recognition from prestigious organizations like the American Heart Association and WELCOA rewarding CentraState for its positive outcomes due to the employee wellness program.

Figure 3. Wellness Return On Investment



When it comes to specifically workplace wellness programs that have looked at plant-based diets, we see very similar successes and benefits. Employee wellness programs that have focused on plant-based/vegan diets have shown not only that they are well accepted by employees (with positive results to employee health), but have also self-reported a 40-46% decrease in health-related productivity impairments at work<sup>22</sup>. Vegan nutrition programs at work also have shown that employees increased intake of various protective nutrients (fiber, folate, vitamin C) and decreased intake of cholesterol, saturated fat, and total fat<sup>23</sup>.

To look at one specific program in particular, the company GEICO put together a study for its employees looking at the impact of diet on productivity and emotional well-being. A total of 292 employees participated, and were broken into a control group given no dietary instruction, and an experimental group given vegan dietary instruction. After 18 weeks, the vegan group had improvements in depression, anxiety, and productivity when compared to the group receiving no dietary intervention<sup>24</sup>. Additionally, the care group Kaiser Permanente is also educating its employees (specifically, its physicians) as well as the general public about the benefits of a plant-based diet for health and wellness<sup>25</sup>. On an even larger scale, the city of Dublin,

OH, adopted an educational program for its 40,000 residents and 370 of its employees on the benefits of a plant-based diet<sup>26</sup>. At the end of the intervention (8 weeks):

- » The percentage of hypertensive participants fell from 20% to 3.7%
- » The percentage of those with high triglycerides plummeted from 40% to 11%
- » The percentage of those with elevated glucose decreased from 28% to 18.5%
- » The average weight loss was 10.5 pounds
- » Medication use decreased, with many of the participants planning to work with their doctors to reduce or get off drugs

## PROPOSED EMPLOYEE WELLNESS PROGRAM AT CENTRASTATE

With the above information in mind, we propose to create and implement a 12-week nutrition and health intervention for the employees of CentraState Healthcare System to advocate a whole food, low-fat, plant-based diet for those employees diagnosed with DM. The main components of this program would be:

- » Educate and encourage employees to consume an ad libitum diet focused on fruits, vegetables, legumes, and whole grains with limited amounts of higher fat plants foods (nuts, seeds, and avocados).
- » Greatly reduce or eliminate the intake of animal based foods for the duration of the program (meat, fish, poultry, eggs, dairy, pork).
- » Greatly reduce or eliminate the intake of refined oils and fats
- » Greatly reduce or eliminate the intake of processed and refined foods rich in refined carbohydrates, fats, and sodium

We suggest a 12-week framework to be able to fully assess any changes in HbA1c levels in employees, as well as give adequate time for other biometric markers to show possible change. We propose that employees would meet as a group 1 day per week for group support and education. The proposed weekly breakdown for this program is as follows:

WEEK NUMBER	ACTIVITY #1	ACTIVITY #2	RESOURCES/MATERIALS
1	Introduction to Program	Basics of a Plant-Based Diet	Jeff Novick SNAP Recipes, List of Suggested/Approved Foods and Brands
2	Check-In/Support	Cooking Class-Breakfast, Lunch, Dinner Ideas	Class Recipes, Additional Suggested Quick Recipes
3	Check-In/Support	Understanding the Causes of Insulin Resistance	Suggested DVDs, Books, and Websites
4	Check-In/Support	Nutrient Density & Weight Loss	Calorie Density Chart
5	Check-In/Support	Cooking Class – Easy Snack Foods	Class Recipes, Additional Suggested Quick Recipes
6	Check-In/Support	Food Label Reading	Food Label Reading Guide
7	Check-In/Support	Grocery Shopping & Eating Out Smartly	Restaurant Ideas Guide
8	Check-In/Support	Cooking Class – Desserts	Class Recipes, Additional Suggested Quick Recipes
9	Check-In/Support	Stress Management & Healthy Movement	Stress Management Tips Guide & Home-Exercise Guide
10	Check-In/Support	Cooking Class – Updating Old Favorites	Class Recipes, Additional Suggested Quick Recipes
11	Check-In/Support	Cooking Class – Sauces, Dressings, and Condiments	Class Recipes, Additional Suggested Quick Recipes
12	Final Check-In/ Suggested Resources	Pot Luck of Plant-Based Recipes	Suggested Resources For Follow-Up and Compliance

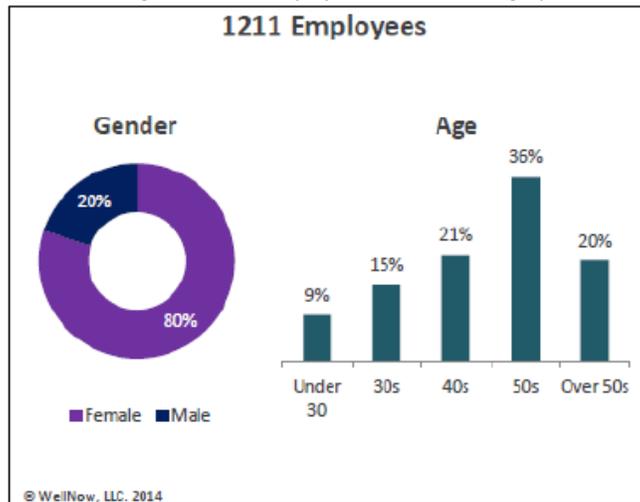
Specific biometric markers we would like analyzed pre- and post-intervention include:

- » Body Weight & BMI
- » Systolic & Diastolic Blood Pressure
- » Blood Lipid Values (Triglycerides, Total Cholesterol, LDL, HDL)
- » Fasting Blood Glucose
- » Hemoglobin-A1c

### WHY DO WE NEED THIS PROGRAM AT CENTRASTATE HEALTHCARE SYSTEM?

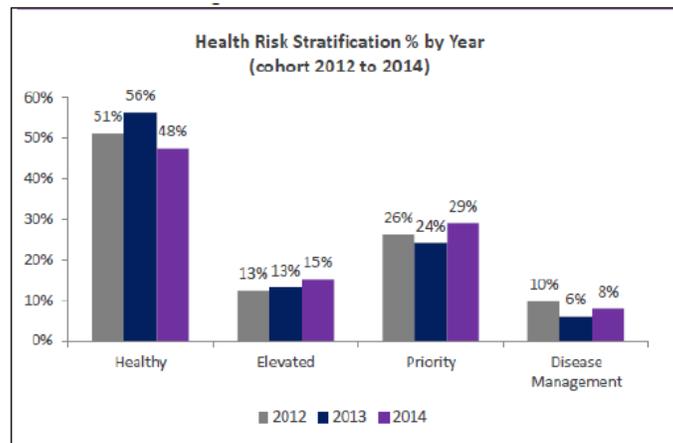
Our Employee population is aging. The chart below (Figure 4) shows the majority of the participants in our 2014 Employee Wellness Program’s Annual Health Assessment are over the age of 40.

Figure 4. 2014 Employee Wellness Demographics



Their health risks are leaking into higher risks categories, which is drastically increases the chances of future chronic disease and inevitably higher costs to CentraState. The chart below (Figure 5) documents the 919 employees who are in the WellNow cohort and how their health risks have changed over the years.

Figure 5. Health Risk Stratification



These employees have completed a health risk assessment and biometric screening for the last three years. It is clear in the chart the healthy population is decreasing, while the elevated, priority, and disease management population are growing. To further demonstrate the need to address the aging population, the average age of healthy participants is 49 years of age, elevated is 50 years of age, priority is 53 years of age, and disease management is 56 years of age.

We believe this program has the ability to reverse these trends in a positive direction. Instead of the health risks growing as the employees age, we believe we can increase the health and well being of the employees by teaching them a new way to care for themselves.

We would target employees who have had diabetes related health claims or were either classified as being diagnosed with diabetes or had a high risk for diabetes from the HRA, employees who HRA/biometric screening determined they were pre-diabetic, and a BMI greater than or equal to 30. We would work with WellNow, LLC to communicate the program opportunity to those employees doing a targeted marketing campaign. We would host the classes in the Star and Barry Tobias Health Awareness Center and would work with the Novo Nordisk Diabetes Center staff to monitor the blood values and anthropometric values of employees in the program. We believe this program is an innovative way to approach the CentraState employee population with DM. Similar programs have demonstrated success within other work place wellness programs and we could achieve similar outcomes at CentraState.

## REFERENCES

1. Number (in Millions) of Civilian, Non-institutionalized Persons with Diagnosed Diabetes, United States, 1980–2011, Centers for Disease Control and Prevention. November 19, 2013.
2. Diabetes Atlas, New Jersey, Centers for Disease Control and Prevention. 2012.
3. The Cost of Diabetes, The American Diabetes Association. April 18, 2014.
4. Opie, LH., Yellon, DM., & Gersh, BJ. (2011). Controversies in the cardiovascular management of type 2 diabetes. *Heart*, 97(10): 6-14.
5. Barnard, Neal. (2006). Dr. Neal Barnard's Program for Reversing Diabetes: The Scientifically Proven System for Reversing Diabetes without Drugs. Rodale, Inc. Emmaus, PA.
6. Trapp, CB. & Barnard, ND. (2010) Usefulness of vegetarian and vegan diets for treating type 2 diabetes. *Curr Diab Rep*, 10(2): 152-8.
7. Trapp, CB., Barnard, ND., & Katcher, H. (2010). A plant-based diet for type 2 diabetes: scientific support and practical strategies. *Diabetes Educ*, 36(1): 33-48.
8. Barnard, ND., Katcher, H., Jenking, DJ., Cohen, J., & Turner-McGrievy, G. (2009). Vegetarian and vegan diets in type 2 diabetes management. *Nutr Rev*, 67(5): 255-63.
9. Yokoyama, Y., Barnard, ND., Levin, SM., & Watanabe, M. (2014). Vegetarian diets and glycemic control in diabetes: a systematic review and meta-analysis. *Cardiovasc Diagn Ther*, 4(5): 373-82.
10. Barnard, ND., Levin, S., & Trapp, C. (2014). Meat consumption as a risk factor for type 2 diabetes. *Nutrients*, 6(2): 897-10.
11. Barnard et al. (2009). A low-fat vegan diet and a conventional diabetes diet in the treatment of type 2 diabetes: a randomized, controlled, 74-wk clinical trial. *Am J Clin Nutr*, 89(5): 1588-96.
12. Barnard et al. (2009). A low-fat vegan diet elicits greater macronutrient changes, but is comparable in adherence and acceptability, compared with a more conventional diabetes diet among individuals with type 2 diabetes. *J Am Diet Assoc*, 109(2): 263-272.
13. Turner-McGrievy, GM., Barnard, ND., Cohen, J., Jenkins, DJ., Gloede, L., & Green, AA. (2008) Changes in nutrient intake and dietary quality among participants with type 2 diabetes following a low-fat vegan diet or a conventional diabetes diet for 22 weeks. *J Am Diet Assoc*, 108(10): 1636-45.
14. Gojda, J., Patkova, J., Jacek, M., Potockova, J., Trnka, J., Kraml, P., & Andel, M. (2013). Higher insulin sensitivity in vegans is not associated with higher mitochondrial density. *Eur J Clin Nutr*, 67(12): 1310-15.
15. Kahleova et al. (2011). Vegetarian diet improves insulin resistance and oxidative stress markers more than conventional diet in subjects with type 2 diabetes. *Diabet Med*, 28(5) 549-59.
16. Barnard et al. (2006). A low-fat vegan diet improves glycemic control and cardiovascular risk factors in a randomized clinical trial in individuals with type 2 diabetes. *Diabetes Care*, 29(8): 1777-83.
17. Barnard, ND., Katcher, H., Jenkins, DJ., Cohen, J., & Turner-McGrievy, G. (2009). Vegetarian and vegan diets in type 2 diabetes management. *Nutr Rev*, 67(5): 255-63.
18. Esselstyn, CB Jr. Gendy, G., Doyle, J., Golubic, M., & Roizen, MF. (2014). A way to reverse CAD? *J Fam Pract*, 63(7): 356-64.
19. Turner-McGrievy, G. & Harris, M. (2014). Key elements of plant-based diets associated with reduced risk of metabolic syndrome. *Curr Diab Rep*. 14(9): 524.
20. McCarty, MF. (2002). Favorable impact of a vegan diet with exercise on hemorheology: implications for control of diabetes neuropathy. *Med Hypotheses*, 58(6): 476-86.
21. McDougall et al. (2014). Effects of 7 days on an ad libitum low-fat vegan diet: the McDougall program cohort. *Nutr J*, 13:99.
22. Kather, HI., Ferdowsian, HR., Hoover, VJ., Cohen, JL., & Barnard, ND. (2010). A worksite vegan nutrition program is well-accepted and improves health-related quality of life and work productivity. *Ann Nutr Metab*, 56(4): 245-52.
23. Levin, SM., Ferdowsian, HR., Hoover, VJ., Green, AA., & Barnard, ND. (2010). A worksite programme significantly alters nutrient intakes. *Public Health Nutr*, 13(10): 1629-35.
24. Agarwal, U., Mishra, S., Xu, J., Levin, S., Gonzales, J., & Barnard, ND. (2015). A multicenter randomized controlled trial of a nutrition intervention program in a multiethnic adult population in the corporate setting reduces depression and anxiety and improves quality of life: the GEICO study. *Am J Health Promot*, 29(4): 245-54.
25. Tuso, PJ., Ismail, MH., Ha, BP., & Bartolotto, C. (2013). Nutritional update for physicians: plant-based diets. *Perm J*, 17(2): 61-66.
26. Stanger, J. Inspired by forks over knives, Dublin, Ohio employees adopt plant-based diet with success. *Forks Over Knives Official Website*. March 12, 2013.

WELCOA<sup>★</sup>  
WELLNESS WORKS HERE

17002 MARCY STREET, SUITE 140 | OMAHA, NE 68118  
402.827.3590 | WELCOA.ORG

