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PROGRAM EVALUATION OF THE LIVING WELL WITH DIABETES PROGRAM OF PRINCE WILLIAM COUNTY, VIRGINIA

By

David C. Fitzgerald

RECOMMENDED:

_____
Virginia Miller DrPH, MS, MPH

_____
Nancy Stegon, MPH, RD

_____
Gabriel M. Garcia, PhD, MA, MPH
Chair, Advisory Committee

_____
Virginia Miller DrPH, MS, MPH
Chair, Department of Health Sciences

APPROVED: _____
Susan Kaplan, PhD
Administrative Dean, College of Health

_____
Date

PROGRAM EVALUATION OF THE LIVING WELL WITH DIABETES PROGRAM OF PRINCE WILLIAM COUNTY, VIRGINIA

A

PROJECT

Presented to the Faculty

of the University of Alaska Anchorage

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for the Degree of

MASTER OF PUBLIC HEALTH

By

David C. Fitzgerald, B.S.

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Abstract

Approximately 25.8 million US residents are living with diabetes. Research has demonstrated that healthy lifestyles can significantly reduce the onset of diabetes. Various community-based programs have been implemented nationally to address diabetes through lifestyle changes. One such program is the Living Well with Diabetes (LWwD) program of Prince William County, Virginia. The goal of this project practicum was to conduct a process evaluation of the Living Well with Diabetes (LWwD) Program of Prince William County, Virginia. Semi-structured interviews were conducted with LWwD program educators. Qualitative data analysis on secondary, post-course evaluations was performed using a thematic method to coding on all short string responses. Results indicate that the intended delivery of the program curriculum resulted in positive changes in the knowledge, attitudes, and applied behaviors of the LWwD program participants. Overall, the continued support of the LWwD program goals would significantly improve the public health and safety of the community.

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Chapter 1: Introduction

Diabetes is one of the greatest public health challenges of the 21st century. According to the Centers for Disease Control (2012), approximately 25.8 million US residents (8.3% of the population) are living with diabetes. Despite the increasing body of knowledge and heightened public awareness, Americans have experienced a 13-fold increase in the prevalence of diabetes over the last 50 years. This growing epidemic has reached historic proportions in this country, as an estimated one out of every three US children born in the year 2000 will go on to acquire diabetes in their lifetime (Moore, Zgibor, and Dasanayake, 2003). With the recent trends and future projected increases in the prevalence of type II diabetes mellitus (also referred to as adult-onset or mature onset) among teenagers and young adults, the already substantial public health effect of diabetes will become of even greater consequence (Beck, 2012). People suffering from diabetes are highly susceptible to other morbid health complications, such as heart disease and stroke, hypertension, blindness, kidney disease, and peripheral vascular disorders. Adults with diabetes are two to four times more likely to die from heart disease and stroke than those without a diagnosis (CDC, 2013). Diabetes remains the seventh leading cause of death in the United States in 2010, as nearly 70,000 lives are claimed as the underlying cause (American Diabetes Association, 2014).

In 2012, the American Diabetes Association (2014) estimated that the total economic costs attributed to diabetes care and management in the United States exceeded $245 billion. This includes both direct medical costs and lost revenue in employee productivity, and represents a 41% increase from the previous five years. Of the direct medical expenditures, 62.4% were provided by government supported health plans, including Medicare and Medicaid programs. When compared to non-diabetics, direct medical expenditures were 2.3 times higher for diabetes-

specific therapies (American Diabetes Association, 2014). Treatment of individuals diagnosed with diabetes account for over one out of every five healthcare dollars (American Diabetes Association, 2014).

Epidemiology of Diabetes

Many U.S. residents are unaware of their vulnerability of acquiring the disease. A recent survey conducted by the American Diabetes Association suggested that only three in 10 adults ages 40 or older with increased risk factors for think they have a "great deal" or "some risk" for acquiring diabetes (Gleason, 2013). Many of the risk factors are modifiable behaviors that can significantly reduce the incidence and impact of the disease. Healthy eating, regular physical activity, and proper healthcare services can mitigate many of the disease complications. However, socioeconomic status also influences the risk of disease. A recent study conducted by researchers at York University concluded that Canadian residents in the lowest income brackets were two to three times more likely to acquire diabetes than higher income earning cohorts (Janus, 2010). Some of the observed barriers to prevention and treatment included lack of access to healthy foods, free physical activity programs, stress and isolation, and expensive medical equipment.

The enormous burden that diabetes imparts on overall physical health is a clear challenge for the public health community. What is often under-appreciated is the impact the disease has on psychosocial outcome. In a multinational cross-sectional survey of diabetic patients, Nicolucci et al., (2013) determined that nearly 14% of all subjects suffered from severe depression. The overall quality of life was rated either poor or very poor by 12.2% of the participants. Not only did two-thirds of respondents believe diabetes had a negative effect of their health, but nearly 49% had not participated in a diabetes educational program.

Since 2014, essential health benefits mandated by the Affordable Care Act require all qualified health plans to provide preventative and wellness services, as well as chronic disease treatment (U.S. Centers for Medicare & Medicaid Services, 2015). While these changes are aimed to prevent or delay the onset of chronic disease symptoms, not all states have opted to expand Medicaid programs to cover uninsured residents (The Advisory Board Company, 2015). Currently, 19 states do not provide coverage to individuals from 19-64 years of age who earn up to 138% of the federal poverty level and otherwise ineligible under current Medicaid limits. Accordingly, many underserved and vulnerable populations in America remain unable to receive important preventative services (The Advisory Board Company, 2015)

In the Commonwealth of Virginia, over 400,000 residents are diagnosed with diabetes, with an additional 132,000 who are not aware they have it (Virginia Cooperative Extension, 2015). The United States Census Bureau (2014) estimates that 11.7% of the households in Virginia live under the poverty line. Since Virginia is one of the aforementioned states electing to forgo Medicaid expansion, many residents in impoverished areas of the state are unable to attain essential diabetes preventative care funded through health insurance services.

Prince William County is one of the most rapidly growing counties in Virginia. It is home to 446,000 inhabitants, and represents an ethnically and racially diverse population within the Washington DC Metro Region. Approximately 35% of the county's residents are non-white minorities, with 22% born outside of the U.S. (U.S. Census Bureau, 2014). Since 2000, the Greater Prince William area has experienced a 43.1% increase in population growth (Prince William County Government, 2014). Much of this growth can be associated with the two most surging demographics—racial/ethnic minorities and seniors. During this time, Prince William County held the distinction as the first Virginia county where non-white minorities make up

more than half of the population (US Census Bureau, 2014). Additionally, adults over the age of 65 continue to be the fastest growing segment of the county. While seniors may only represent 7.1% of the current population, residents from the "Baby Boomer" generation are reaching the age of 65 at a rate of one person every seven minutes (Cotter, 2012). The combination of seniors above 65 and "Baby Boomers" already represent over 31% of the county population.

Several other risk factors may also increase Prince William resident's vulnerability to diabetes. In a comparison to national benchmarks, Prince William County residents possess a higher prevalence of adult obesity, adult tobacco smokers, and residents that did not graduate high school (Prince William Coalition for Human Services, 2013). Diabetic screening rates and the ratio of residents to primary care physicians were also reported below national benchmarks. Despite the significantly lower proportion of persons living under the federal poverty line than the rest of the Commonwealth (7.0% vs 11.7%, respectively), it possesses a larger uninsured population (14.5% vs 14.0%). This may be attributed to the higher cost of living and corresponding salary, and the number of people per household. As such, an increased number of county residents not only fail to qualify for Medicaid, but cannot afford private insurance plans. Until state legislators act to narrow the gaps in healthcare services, community preventative and wellness education programs will be paramount in addressing the disparities in chronic disease management and quality of life.

In 2013, the Prince William Health District (2013) conducted a community health assessment aimed to guide public health planning and intervention. Among the data indicators measured were high-risk lifestyle behaviors associated with diabetes onset and complications. Approximately 20% of all survey respondents identified lack of exercise, defined as less than

150 minutes of physical activity per week, as one of the top health issues in the jurisdiction. Greater Prince William County also exceed the national benchmark limits for obesity- defined as a Body Mass Index (BMI) over 30. In low income and underserved jurisdictions of the county, access to health foods was ranked as the third greatest public health concern in the community. Lastly, cost of healthcare was selected as the greatest public health concern in the county (41%).

Chapter 2: Background

Research has demonstrated that healthy lifestyle behaviors can significantly delay and reduce the onset of diabetes. Recently, the American Diabetes Association (2014) published the Standards of Medical Care in Diabetes-2014. This document serves as an evidence-based set of recommendations aimed to favorably affect health outcomes of individuals diagnosed with diabetes. Many of these recommendations focus on self-management education and support services through healthy eating, weight control, and increased physical activity. Similar recommendations have been supported in the United Kingdom. Dunkley and associates (2014) conducted a meta-analysis to measure improvements in outcomes following the adherence to international diabetes clinical management guidelines. The effectiveness of the United Kingdom's National Institute for Health and Clinical Excellence (NICE) guideline recommendations were measured to determine the degree of weight loss in pooled study of subjects receiving education in diabetes lifestyle education. Twenty-two randomized controlled trials were included for review. Outcome data included mean body weight change from baseline at twelve months. Other pooled secondary outcome variables were reported across selected studies and included changes in body mass index, waist size, fasting glucose, HgbA1C, total cholesterol, LDL, HDL, triglycerides, and blood pressure. Best practice lifestyle interventions were associated with a mean weight loss of 2.32 kg (95% CI: -2.92 to -1.72; $i^2 = 93.3\%$). Further, greater adherence to guideline recommendations also resulted in significant improvements in waist circumference (-0.52 cm, p=0.007), triglycerides (-0.03 mmol/L, p=0.016, and BMI (-0.12 kg/m^2, p=0.028). There were eight studies that reported the incidence of diabetes. The pooled incidence rate was 34 cases per 1,000 person-years, suggesting that lifestyle interventions did lower diabetes progression rates. While the adoption of clinical

management guidelines was associated with improvements in health and outcome, there was considerable variability in the overall effectiveness in each respective study. As such, maximizing the adherence to industry guidelines will help realize greater gains in diabetes health status.

In a cluster randomized controlled trial across twenty primary care clinics in Japan, Adachi and colleagues (2013) demonstrated significant reductions in Hemoglobin A1C values in subjects (n=100) that participated in a Structured Individual-based Lifestyle Education (SILE) program versus subjects in the control group (n=93). SILE participants received four structured self-management courses provided by registered dieticians on diet, exercise, and proper stress management. The control group received general advice from a registered dietician, general practitioner, or clinic nurse. At the 6-month post-intervention period, the SILE group experienced a 0.7% decrease in Hemoglobin A1C as compared to the 0.2% decrease observed for the control population that did not receive education (difference -0.5%, 95% CI: -.02 to -0.8%, p=0.0004). The SILE group also experienced a significant increase in the daily consumption in grams of vegetables (difference- 29.0, 14.9 to 43.1g, p=0.001). While there were also observed improvements in secondary study endpoints such as body mass index, arterial blood pressure, and serum triglycerides, none of them reached statistical significance. The authors concluded that supplementing primary care diabetes education with SILE program training can improve the glycemic control of patients with type II diabetes.

In a meta-analysis of randomized controlled trials of lifestyle education for type II diabetes, Yamaoka and Tango (2005) concluded that education was effective in improving glycemic control and the new diagnosis of diabetes in high-risk individuals. A filtered literature search identifying 123 studies yielded resulted in 13 trials measuring two-hour fasting glucose values

and positive diabetes diagnosis outcomes. Pooled study subjects were followed for > 6 months after lifestyle education intervention. Two-hour plasma glucose values and the relative risk of a diabetes diagnosis was compared to study controls at 12-months post-intervention. Lifestyle education resulted in a significant decrease in the risk of acquiring diabetes (RR=0.55, 95% CI: 0.44-0.69). While there was also an observed difference in the 2-hour plasma glucose by 0.84 mmol/l (95% CI: 0.39-1.29), the results did not reach statistical significance. The authors concluded that lifestyle education offerings are an effective tool in preventing the onset of type II diabetes.

A recent study conducted by Greenwood and colleagues (2014) evaluated the Group Lifestyle Balance (GLB) model on weight loss across various thresholds of diabetes status. The GLB model is an adaptation of the Diabetes Prevention Program (DPP) endorsed by the University of Pittsburgh. Subjects with a Body Mass Index (BMI) of $\geq$ 25 kg/m^2 were assigned to one of three groups (pre-diabetes, diabetes confirmed, or no diabetes) and enrolled into a 19-month diabetes education program offered through the University of Pittsburgh Medical System. Exit interviews conducted at the end of the program revealed that all three assigned groups experienced significant weight loss while enrolled in the program. The authors concluded that supporting diabetes education and prevention strategies in the community through large healthcare networks are both feasible and effective in reducing diabetes-related factors, regardless of pre-existing disease status.

The GLB model had been previously tested in 2011 as part of a multicenter community-based diabetes prevention strategy (Kramer et al., 2011). In this study, educators from the University of Pittsburgh delivered the GLB program at three unique outpatient centers representing urban, suburban, and rural communities in Western Pennsylvania. Using the GLB

lifestyle modification model, 81 non-randomized individuals participated in the 12-session program. The outcome measures were weight loss and achievement of study goals, and secondary measures included changes in blood glucose levels, cholesterol, triglycerides, obesity, and hypertension. At the end of the program, participants not only experienced an average weight loss of 5.1%, but also realized significant decreases in all of the indicated cardiac risk factors. Despite the geographic characteristics of the community, diabetes education was effective in promoting healthier lifestyles.

The DAWN2™ study aimed to assess the perceptions of healthcare professionals across the world regarding the self-management and training of patients with diabetes. Holt et al., (2013) surveyed approximately 4800 healthcare clinicians across 17 countries to identify barriers and resources for the optimal delivery of diabetes-related care. The survey revealed that up to 92.9% of respondents believed people with diabetes needed to improve self-management activities. The need for significant improvements in self-management education was reported by 60% of healthcare providers. Other notable areas for improvement included resources for diabetes prevention (78.8%), early diagnosis (67.9%) and psychological support (62.7%). Moreover, discrimination against diabetic patients was reported by approximately 33% of respondents. Identifying the barriers that exist in the current delivery of healthcare and education services is paramount in realizing significant improvements in patient care and outcome.

The economics surrounding the medical treatment of diabetes are staggering, and the increased spending to deliver tertiary prevention therapies is unsustainable. Over 20% of the nation's healthcare costs are attributed to the treatment of people with diabetes (American Diabetes Association, 2013). A significant portion of these expenditures are aimed to manage complex health conditions and injuries already sustained by the patient. In severe cases,

rehabilitation services may help restore the patient's ability to function, but may still not avoid long-term physical impairment. Wu and colleagues (2012) stratified diabetes healthcare costs against the severity of disease-related complications. By using ICD-9 codes and laboratory data, a Diabetes Complication Severity Index (DCSI) was used to determine if the severity of disease was associated with an increase in healthcare related-costs. Medical charges for patients receiving medical care from a primary care treatment clinic on at least 2 occasions during the calendar year were included for review. A DCSI score was assigned based on the ICD-9 codes generated during triage. DCSI scores range between 0-13 across seven categories, with low scores favoring normal and slightly abnormal complications. Severe complications include significant events such as cerebrovascular disturbances, neuropathies, cardiovascular disease, and metabolic complications. Results indicated that each one-point increase in DCSI scale was associated with a 27% increase in healthcare costs. Patients with scores of five or greater accumulated healthcare costs five times greater than those subjects with a score of zero. While subjects suffering from diabetes are at an increased risk of developing chronic complications, the severity of disease can be controlled with effective prevention strategies. Inpatient costs were comprised of 70% of all medical expenditures in subjects with DCSI scores of five or greater. Even modest gains in patient education and prevention would not only delay the onset of these symptoms, but also reduce overall treatment costs.

Community-based lifestyle education programs have proven to be an effective intervention in reducing the burden of diabetes. However, one of the difficulties in securing sustained support and resources has been the inability to quantify overall cost-effectiveness of the program. Economic evaluations that demonstrate favorable cost-benefit ratios help key stakeholders make informed health policy decisions. Lawmakers, government agencies, and private financiers are

influenced by cost-benefit ratios that maximize positive long-term outcomes and minimize costs. The economic models used to calculate program cost-effectiveness are difficult to institute in community programs. Saha and colleagues (2010) conducted a systematic review of lifestyle programs aimed to prevent diabetes and cardiovascular disease. A filtered review of the literature yielded 46 studies that met the inclusion criteria from around the world. While the authors concluded that lifestyle interventions seemed cost-effective in reducing the long-term risk of diabetes, there were several limitations to the study. There was significant variation between studies in methodology. Various lifestyle interventions were employed, including diet, physical activity, and medication such as Metformin. In the absence of an intervention control, it is difficult to ascertain accurate cost-benefit ratios. Further, international countries determine their cost-effectiveness threshold differently from one another. For example, the threshold used for the United States was $50,000 per QALY (Quality Adjusted Life Year). This figure is presumably a limit on what a policy decision maker will invest in a health service. Various researchers believe that this may be a misleading value. Combined interventions, such as diet and exercise, have been considered more beneficial that any single intervention. Community education programs that incorporate multi-modal initiatives to reduce the risks of diabetes will be associated with the most favorable cost-benefit ratios.

The use of the internet technologies may confer significant benefits in reinforcing newly-acquired lifestyle behaviors from resident training. Heinrich and colleagues (2011) evaluated a virtual, web-based Diabetes Interactive Education Program (DIEP) as a learning and self-management tools in subjects with type II diabetes. The online DIEP program leverages images, video and real patient experiences to deliver national guidelines for diabetes care and management. Subjects randomized to the online DIEP group were provided access for two

weeks. Pre- and post-test knowledge questionnaires were administered to both the experimental and control groups. The control group did not receive access to the website until after the post-test was completed. Additionally, user evaluations and interviews were conducted to determine the perceived quality of the website and use of functionalities. Subjects in the experimental group possessed significantly higher post-test knowledge scores compared to control ($p < 0.05$). This effect was unchanged across age, gender, educational level, and time since diagnosis. DIEP subjects also rated the web resources favorably according to overall satisfaction (94%), user-friendliness (98%), and the use of sound features (91%). However, not all subjects utilized all of the features of the program as intended. Forty-one percent used the site search function, 28% completed the workbook questions at the end of each learning module, and only 60% sought additional information on the site. There was an average of 3.5 website visits per subject, with a mean visit duration of 58 minutes. Despite the improvements in theoretical knowledge and quality of functionality, only a minority of participants realized the full benefits of the program. While online tools may be a cost-effective strategy to educate a broad target audience, it seems its use may be of greatest benefit when incorporated into a comprehensive, multi-modal lifestyle wellness program. Skills learned in a live classroom environment can be reinforced with additional web-based tools and services for sustained effect. Over half of the participants enrolled had been diagnosed with diabetes for at least four years. The authors believe this may have contributed to the higher than expected pre-test scores prior to intervention. Similar results were observed by Chau and associates (2012), as subjects that were invited to view web-based video clips rated them beneficial in learning self-management skills.

Maintaining a sustained effect from lifestyle education programs is difficult to appreciate in community-based settings. Kunti et al., (2012) concluded that ongoing education and contact

time is required to realize long-term biomedical benefits from lifestyle management. In a three-year follow-up of a multi-center randomized controlled trial of diabetes self-management education in the United Kingdom, (DESMOND program), there were no significant differences observed in HgbA1C values at three years for subjects receiving six hours of lifestyle education when compared to control (difference -0.02, 95% CI: -0.22 to 0.17, p=0.81). Despite that study subjects exhibited a greater understanding of their illness when compared to those who did not receive DESMOND training, there were no significant differences in biomedical, lifestyle, and medication usage outcomes. Activities aimed to combat the erosion of both knowledge and lifestyle modification must be addressed by public health officials to optimize the health and quality of life of its constituents.

One of the barriers in analyzing the long-term effects of lifestyle modification is the tools employed to measure them. An individual's self-efficacy, broadly defined as ones perceived ability to perform certain activities, can only be appreciated with valid and reliable tools aimed to support self-management skills. Sturt and colleagues (Sturt, Hearnshaw, & Wakelin, 2010) determined that a 15-item diabetes self-management scale (DMSES) was reliable, valid, and consistent in measuring self-efficacy in subjects with type II diabetes. One hundred seventy-five participants were prospectively enrolled and randomized to receive education manuals and live diabetes event training. Healthcare professionals were also consulted on the validity of the constructs. Outcome measures included both HbA1c values and a six-page questionnaire containing items specific to diabetes-related emotional distress and self-efficacy. The authors concluded that the DMSES UK tool is suitable to determine the ability for people to self-management their diabetes. The use of these types of tools may confer significant benefit in programs designed to help increase long-term empowerment of its participants.

In order to effectively reach the individuals of greatest need, community-based wellness programs must appreciate the background and demographics of its constituents. Diabetes is a continuously increasing danger on public health and safety. The prevalence of the disease is growing, and support for lifestyle modification services must propagate accordingly. However, many individuals suffering from diabetes may not seek additional education and support. Temple and Epp (2009) analyzed non-attendees of a self-management education program services in rural and urban areas of Western Canada. Patients receiving a positive diagnosis of diabetes by a healthcare provider were referred to both group and individual education services delivered at a healthcare clinic. Of the nearly 2700 patients that were referred to classes over a two-year period, 31% (n=632) did not attend their scheduled appointments. A cross-sectional telephone survey was conducted across all referred patients to determine the circumstances of those individuals failing to attend classes. Attendees of the course were more likely to be older (p=0.001), reside in lower-income households (p=0.003), and be freed from a main activity such as employment (p=0.004). There were no significant differences observed across gender, marital status, highest level of education, or the number of emergency room visits the previous six months. As such, non-attendees were more likely to be younger, work full-time, and have a higher earned income. While these results may only be representative of one region, it poses a potentially significant question as to whether lifestyle education programs address the needs of those in greatest need. Are classes offered at a time and location that is conducive for the majority of vulnerable individuals? Is there difficulty for working people to make an appointment during business hours? Are younger patients unable to transition through the stages of change as the elder cohorts? The Transtheoretical model of change suggests people in the early precontemplation stages are not ready to promote new and healthier lifestyle behaviors.

This may not only be attributed to a lack of susceptibility and severity, but may be associated with the time proximity of diagnosis. Newly diagnosed patients may be less motivated to act quickly in lifestyle behavior changes. Individuals that are able to realize early lifestyle changes are more likely to preserve their long-term quality of life. Customizing education programs to meet the needs of the population is paramount in optimizing the program effect and improved outcomes.

Living Well with Diabetes Program

The Living Well with Diabetes Program (LWwD), previously known as the Dining with Diabetes Program, is a community-based education program aimed to improve the quality of life of Virginia residents diagnosed with diabetes (Virginia Cooperative Extension, 2015). The program was launched in 2006 by the Virginia Cooperative Extension and modeled similarly to the West Virginia Dining with Diabetes Program (West Virginia University Extension Service, 2014). The Virginia Cooperative Extension (2015) is an educational outreach program of Virginia Tech and Virginia State University, and part of the National Institute for Food and Agriculture of the United States Department of Agriculture. Participants in the LWwD program receive instruction on the selection of healthy food choices, medical management, and the importance of regular physical exercise to improve diabetes self-management skills. The overall goal of the program is to improve the health of residents and families affected by diabetes in Prince William County. The program goal is supported by applied learning skills of diabetes lifestyle management, including:

- Increased knowledge of health food choices and use of medications for families with diabetes or other chronic diseases.
- Demonstration of healthy cooking techniques.

- Promotion of physical activity as a part of diabetes control.
- Encouragement of self-management with opportunities to share and learn from one another.

Four two-hour lessons are designed to educate participants on a healthy diabetes lifestyle. Each class begins with a light meal served to help demonstrate health eating, types of food choices (favoring light carbohydrates), and portion control. Classes are conducted to describe the health consequences of uncontrolled diabetes and pertinent medical information. Lessons are provided regarding the proper reading of food labels, along with advice on choosing the appropriate groceries and menu items. Additional discussions involving both medication information and routine physical activity for weight control. A follow-up meeting is scheduled three months after the last class to evaluate participant performance and measure post-program Hemoglobin A1C values.

The LWwD curriculum incorporates the Social Cognitive Theory to educate participants on healthy diabetes lifestyle behaviors. The Social Cognitive Theory (SCT) is relevant for designing lifestyle modification and health promotion programs. (McCaffrey, 2014; Bandura, 1998). This theory has been implemented to predict diabetes-related outcomes following wellness education programs (Chapman-Novakofski & Karduck, 2005). Unlike other psychological models of behavior, the Social Cognitive Theory emphasizes social influence and external reinforcement. It aims to promote goal-directed behavior that can be maintained over a prolonged period of time. The SCT incorporates several key constructs and ideas to interpret individual functioning. These constructs include Observational Learning, Outcome Expectations, Perceived Self-efficacy, Goal-setting, and Self-regulation (Denier, Wolters, and Benzon, 2014).

Observational learning posits that individuals learn by viewing the skill or behavior. There are multiple models that support observational learning, including live direct performance, audio, and video demonstrations. Each program participant observes a class demonstration of a healthy meal preparation. A registered volunteer chef creates and serves a three-course meal that supports a diabetic diet. The recipes are shared, and the classmates are encouraged to prepare these recipes in their own home. Another observational model involves the learning of grocery store label reading. The Program Director provides examples of various food labels, with demonstration and reinforcement from all of the participants in the class. Students are provided labels from similar types of food and are asked to compare and contrast each product. These relevant aspects can be retained and committed to long term lifestyle change.

Outcome expectations are responsible for the decisions that individuals make, and the feelings that resonate after the exhibited behavior. Positive outcomes are valued, and unfavorable decisions are typically discouraged. During the program, course educators encourage newly-applied behaviors acquired in class. Participants are praised for maintaining an exercise log and daily nutritional diary. Since these behaviors may contradict the participant's previous experience, changes to behavior can be promoted through observational modeling.

The perceived self-efficacy defines an individual's belief that they are able to implement healthier lifestyle behaviors. An increased self-efficacy correlates with both the confidence and motivation to successfully commit to a diabetic lifestyle. While previous failures to institute change may exist, program participants are presented with real-life examples of proper diabetes management. One of the faculty members is a retired primary care physician that possess insulin-dependent diabetes. His shared clinical knowledge and life experiences in diabetes management help participants realize the elements required to succeed.

Goal setting activities are aimed to identify anticipated and preferred outcomes of the program. The LWwD program sets several goals for the participant over the three-month period. First, the successful student should commit to thirty minutes of physical activity at least three times a week. Each student is also expected to realize a significant reduction in blood serum Hemoglobin A1c values from class initiation. The overall goal is to increase the individual's confidence in making healthier lifestyle choices.

Self-regulation describes a participant's ability to manage their actions to achieve their desired outcome. The curriculum of the LWwD aims to transform the newly-acquired behaviors into long-term modifications. Graduates of the program are asked to return after three months from the beginning of the program to obtain a Hemoglobin A1c result and report on their progress. Other self-regulation activities include the individual's ability to read food labels, identify diabetes-specific medications, and share recipes to prepare diabetes-friendly meals. Self-regulation is largely dependent on the previous concepts of the SCT model.

Chapter 3: Goals, Objectives, and Research Questions

Project Practicum Goals

The goal of this proposed project practicum is to conduct a process evaluation on the Living Well with Diabetes Program of Prince William County. Program evaluation is an integral component to helping the public health programs achieve measurable, short and long-term outcomes (Gallivan, Greenberg, and Brown, 2008). The purpose of the process evaluation is to provide key stakeholders information focused on the operations, implementation, and service delivery of the LWwD program. This information would include a community needs assessment of the public health dangers of diabetes, identifying current barriers and facilitators of the LWwD program, and learning how to best measure LWwD activities and effects.

While the Prince William County LWwD program has been operational since 2006, a formal program evaluation has yet to be conducted. Previous outcome measures were largely limited to participant Hemoglobin A1C value changes recorded before and after the successful completion of the LWwD program. Recently, the ability to secure HgbA1c test kits has become increasingly difficult, further complicating the ability to continually evaluate the benefits of the program.

Project Aim

The aim of the project practicum is to assess the context, type of recruitment, extent of reach, quality and level of implementation, and barriers and facilitators of the LWwD program. The process methods will identify several core concepts of the overall program framework (Figure 1). This proposed evaluation framework was described and refined by both Griffin et al., (2014) and Linnan & Steckler (2002).

Figure 1. Core concept framework for evaluation

Evaluation Questions

Specific evaluation questions are proposed to guide the evaluation process as well as provide information that can be used to improve the overall delivery of the LWwD services. The process evaluation questions were as follows:

- Are there contextual and environmental factors that may influence program effectiveness and delivery?
- What methods are being used recruit bring new participants into the program?
- How many individuals are affected by the LWwD program?
- What are the characteristics of the participants served by the LWwD program?
- Is the LWwD Diabetes Program being delivered as intended?
- What quality of intervention is being received by the LWwD participants?
- How much exposure are the LWwD program participants receiving during each program activity?
- How well are LWwD participants responding to the LWwD program?

- Are there interventions delivered through the program that are more effective than others?
- What are the facilitators of the LWwD program?
- What are the barriers of the LWwD program?

In addition to the above-mentioned questions, evaluation measures, indicators, methods and sources are described in the Evaluation Matrix (Appendix A).

Evaluation Objectives

The overall objective for this process evaluation is to determine how the LWwD program is being received by participants and education volunteers. Secondary objectives for this program evaluation include the following:

- Identify the barriers and facilitators to LWwD program delivery.
- Describe to what extent that the LWwD program is being delivered as planned.
- Determine whether collected data is being utilized to refinements and improvements to the program.
- Support organizational change and development.

There may be barriers that may limit the effectiveness of the evaluation (French, Wittman, and Gallagher, 1989). Resistance to obtaining information may include but not be limited to; number of participants enrolled in the program, availability of program data, and demographics of the participants.

Chapter 4: Methods

Study Design

A multi-method evaluation including a semi-structured interviews and secondary data analyses was performed to measure the intended changes of the LWwD program. Purposive, semi-structured interviews were conducted with the LWwD educators to assess evaluation core concepts, including program context, recruitment, reach, implementation, and barriers and facilitators. Focus interview questions were conducted via telephone with transcription performed by the Primary Investigator. Telephone interviews were scheduled on dates convenient to the program educators.

An analysis of secondary data was performed on existing LWwD post-course evaluation surveys received from program participants that completed the LWwD program (Appendix B). The course evaluation is comprised of 10 de-identified, open-ended questions that asked participants to self-report the perceived changes they have experienced as a result of taking part in the LWwD program. Evaluations were administered to the participants during the follow-up session approximately three months after the conclusion of classes. Responses obtained from these evaluations were utilized to describe the reach, challenges, recruitment, and context of the evaluation core concepts.

Exploratory study methods were implemented to review existing demographic information on LWwD program participation. Data was extracted from participant registration forms to measure class enrollment and primary residence location between the program dates of June 2012 and January 2016. The residential postal zip code was extracted from the registration form and entered into a Microsoft Excel spreadsheet for Mac v15.18 (Microsoft Corporation,

Redmond WA). The resultant registration data was used to identify the program reach and dose received by the participants.

Data Collection

After IRB approval [IRB #848324-1], interviews with LWwD educators were conducted via telephone between March 21st and March 25th, 2016. Three program volunteers consented to participate in the interviews. Telephone interviews ranged between 31 to 48 minutes in duration. Direct quotes from the interview participants were collected by the Primary Investigator and de-identified for analysis and interpretation.

Post-course evaluations from previous LWwD session participants were collected from June 2012 to January 2016. All qualitative data was encoded for analysis. In January 2016, a revision was made to the evaluation form to capture additional data from the Fall 2015 course session. The data from this newly revised form (Appendix C) was analyzed along with the previous evaluation template. An inductive approach to qualitative data analysis was conducted using a thematic method to coding all short string respondent questionnaire answers (Attride-Stirling, 2001).

Research questions pertaining to several of the process evaluation questions were addressed by reviewing the LWwD participant database, which dates back to June 28, 2012. Reviewing the information collected from previous LWwD courses will quantify the number of sessions offered, locations of those sessions, accessibility to the participants, and the class to instructor ratios. The LWwD Program Director provided this information for review and analysis.

Instruments and Analysis

Interviews with program educators were conducted using a structured interview template (Appendix B). The interview template was comprised of eleven open-ended questions designed

by the Primary Investigator to address evaluation questions and core concepts. Answers to questions were transcribed by the Primary Investigator during the interview. At the completion of the interview answers were de-identified for analysis.

After reviewing the results from the LWwD post-course evaluations, all relevant elements (both words and statements) were coded for analysis using QDA Miner Lite v1.4.3 (Provalis Research, Montreal, QC, Canada). Each response was assigned a one or two-word code by the Primary Investigator. Similar codes were sorted into larger categories relevant to the evaluation questions. Categories were then color coordinated, labeled, and analyzed for interconnectedness. Frequency and proportion statistics were performed to quantify the number of responses to each survey question.

Data obtained from the program registration forms was joined to an ArcGIS shapefile of Prince William County (Esri, Redlands, CA). Postal zip code residence was patterned and displayed using choropleth spatial mapping techniques. Shaded areas represent the proportion of participants over the aggregated area of the county. The completed map was saved as a layer file, and then presented in jpeg format (Figure 2). Spatial analysis was conducted to determine the reach of the program across the county by assessing the distribution of LWwD participant residences and distance to travel. The number of registrants enrolled in each session since January 2010 were collected and reported as mean participants by session and year.

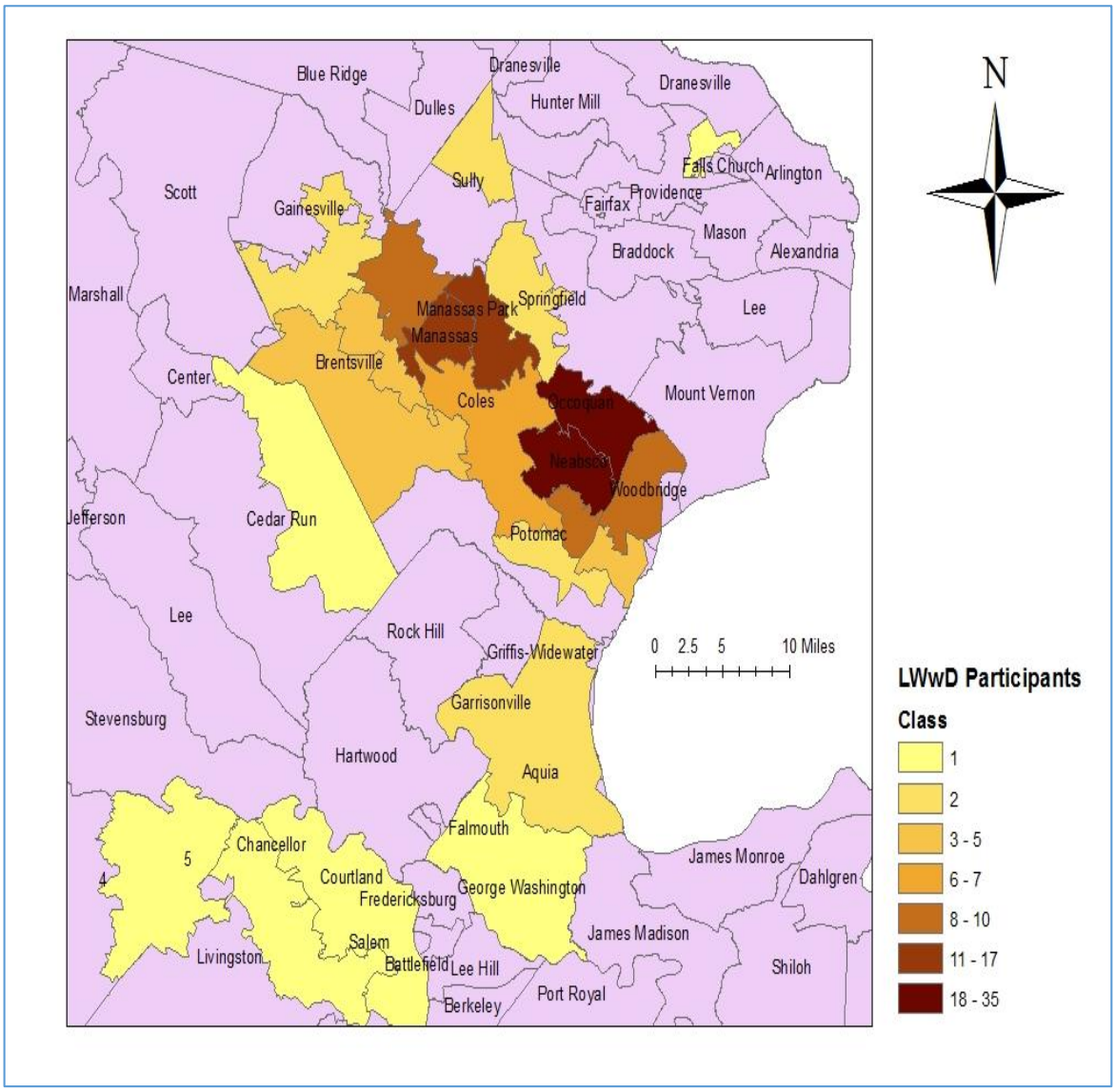

Figure 2. The residential districts for the LWwD participants in Northern Virginia.

Chapter 5: Results

The aim of the project practicum is to conduct a process evaluation of the LWwD Program of Prince William County, Virginia. The overall objective for this process evaluation is to determine how the LWwD program is being received by participants and education volunteers. Secondary objectives for this program evaluation include the following:

- Identify the barriers and facilitators to LWwD program delivery.
- Describe to what extent that the LWwD program is being delivered as planned.
- Determine whether collected data is being utilized to refinements and improvements to the program.
- Support organizational change and development.

There were eleven evaluation questions that were identified for study, and these questions were designed to meet the objectives of the process evaluation.

Several data sources were utilized to answer each of the questions. These sources included LWwD faculty interviews, participant registration database, LWwD program curriculum and materials, and participant post-course evaluations. The results from each of these data queries were aligned to help answer each of the evaluation questions.

Data Source 1: LWwD Participant Registration Database and Materials Review

Reach- individuals affected by the LWwD program. From 2010 to 2015, there were 162 individuals who registered for the LWwD program. The geographic distribution of participants was analyzed by residential district and postal zip code (Figure 2). Overall, twenty-three postal zip code regions in Northern Virginia were represented in the LWwD database (Table 1).

Table 1

Residential Postal Zip Codes of LWwD Participants in Virginia.

Postal Zip Code	Number of Registrants
22193	35
22192	30
20110	17
20111	14
20109	10
22191	10
22025	9
20112	7
22026	5
20181	4
20136	4
20155, 20151, 20124, 22172, 22554	2
20182, 22405, 22407, 22043, 22508, 22553, 20119	1

There are 17 postal zip codes assigned to Prince William County. Of those, 65 (40.1%) of all the program participants resided in the 22192 and 22193 postal code areas representing the Occoquan and Neabsco districts, respectively. Thirty-one (19.1%) of participants resided in the 20110 and 20111 postal codes areas representing Manassas and Manassas Park, respectively. Conversely, 12 (52.2%) of the postal code areas were associated with two class participants or less.

Implementation- exposure to the LWwD program. There are two courses offered per calendar year. Class sessions are generally hosted in the Spring and Fall months. Each course is comprised of four weekly sessions, followed by a three month post course follow-up session. Session curriculum consists of the following topics:

- Session 1: Living Well with Diabetes
- Session 2: Carbohydrates and Sweeteners, Fats, Sodium, and Heart Disease

- Session 3: Physiology of Diabetes and Medications
- Session 4: Meal Planning and Eating Out
- Follow-up Session: Three months after Session Four- Guest Speaker

Class sessions have been held at two locations in the county. The primary classroom is located at the James J. McCoart Administration Building in Woodbridge, Virginia. An alternative and seldom used site has been the Manassas Free Library in Manassas, Virginia. Class session times have varied between afternoon (12pm-2pm) and evening (6pm-8pm) appointments. Binders are distributed at the beginning of session one that contain all of the lecture handouts, recipes, and articles on healthy lifestyle choices. Additionally, Hemoglobin A1C lab samples are withdrawn from each willing participant to establish a baseline value before course initiation. Repeat samples are performed at the three-month follow-up session to help measure any changes in diabetic management. Each session is accompanied by a light three course meal prepared by a volunteer chef. Recipes from all catered session meals are shared with the class participants. Sessions are moderated by the LWwD Program Director, volunteer physician, registered dietician and nurse. At the conclusion of class, a course evaluation is distributed to the participants to measure their attitudes and beliefs of the program. Participants are encouraged to provide their email address to receive periodic communications and dietary resources after the conclusion of class sessions.

Worksheet 1: Interview Template for Program Educators (Semi-structured interview)

Three of the four volunteers of the program consented and participated in the semi-structured interview (Tables 2-4). Questions one to three were removed from reporting to de-identify the interview results. Interview questions were administered according to the core concepts of the evaluation.

Table 2

Semi-Structured Interview Results (LWwD Educator) Interview Subject #1.

	Question (Evaluation)	Answer (Program Educator)
4	How are participants referred to the LWwD program?	County newspapers- not sure if they still support a county paper in PWC. Other sources are county PR, communications. We are in need of a PR outreach.
5	What do you find to be the greatest barriers to effecting change in lifestyle behaviors?	There are a few things. First, some people tend to be stuck in their habits. If you 'name it', you are obliged to 'claim it'. Participants don't respond well if they feel threatened or lectured to. The aim is to educate them without scaring them too much.
6	How are LWwD participants are responding to the program?	Participants are responding well to the program overall. Over the last few classes, participants have seen a significant decrease in their post-program Hemoglobin A1C values.
7	What are the contextual and/or environmental factors that may influence program effectiveness and delivery?	People need to feel compelled to take action.
8	How would you recommend increasing the enrollment of Prince William County residents into the program?	Distribute flyers during other county hosted classes. More flyers and advertisements at libraries and county buildings. Flyers should also be distributed at the Supervisors buildings and at health fairs.
9	Aside from the current educational resources offered, are there other tools and materials you believe should be available to the class?	Perhaps more classes at night.
10	In your opinion, what are the strengths of the LWwD program?	Hands on experience. People feel good about coming. When they feel welcomed, they are encouraged and feel empowered to make change. They also learn that just because they are diabetic doesn't mean that all foods are forbidden.
11	Any other items you wish to share?	None at the moment

Table 3

Semi-Structured Interview Results (LWwD Educator) Interview Subject #2.

	Question (Evaluation)	Answer (Program Educator)
4	How are participants referred to the LWwD program?	Flyers at the county centers and libraries. Word of mouth is key.
5	What do you find to be the greatest barriers to effecting change in lifestyle behaviors?	People like fast, easy pre-prepared foods. They don't want to think about it. They don't eat healthy enough. They need more fish, vegetables, and beans.
6	How are LWwD participants are responding to the program?	I've seen some people respond very well. A few need mentoring with respect to managing carbs. There is no magic fix. You need to take the time to prepare your meals. Plan throughout the week. It takes 1.5 hours to plan for the week and generate a shopping list.
7	What are the contextual and/or environmental factors that may influence program effectiveness and delivery?	People are inundated with TV. McDonalds, Burger King, Chili's. They need instant gratification.
8	How would you recommend increasing the enrollment of Prince William County residents into the program?	Cooking classes. I know this may not be popular with the county, but they should extend the program with an 8-week session on cooking and starting your own garden.
9	Aside from the current educational resources offered, are there other tools and materials you believe should be available to the class?	In my previous profession, I observed school-aged children in other countries. Every student had input and knowledge into the food choices at a very young age. In American schools, some serve good food, some serve garbage. Human bodies are not able to absorb them. Children need to be more involved with their food choices.
10	In your opinion, what are the strengths of the LWwD program?	They will become aware if they are opening to listening. As I said, planning is so key. Diet, low sodium diets, and low carbs make bodies happy. It will reduce your blood pressure, lower cholesterol, and the effects of NIDDM.
11	Any other items you wish to share?	Preventative medicine. Preventative maintenance. Catch kids while they are young. They need to learn how to harvest foods in the garden and get the foods to the table. This should include educating the parents. Nancy does a beautiful job with the diabetics. The county needs to wake up. One simple question I would ask the county- what is it you don't want?

Table 4

Semi-Structured Interview Results (LWwD Educator) Interview Subject #3.

	Question (Evaluation)	Answer (Program Educator)
4	How are participants referred to the LWwD program?	I believe most are self-referral. Some are referred through advertisements through flyers. Flyers may also be distributed through the community, but I am not certain. Also, there are some referrals through health providers.
5	What do you find to be the greatest barriers to effecting change in lifestyle behaviors?	Getting the education to know what to change. Also, the access to change, such as financial resources and time. Lack of education is a big problem for many people. Food is 24/7- you can find it anytime you want to.
6	How are LWwD participants are responding to the program?	Very favorably I believe. I hear very positive comments. Students appear engaged. Very favorable.
7	What are the contextual and/or environmental factors that may influence program effectiveness and delivery?	Eastern vs Western Prince William County. LWwD used to offer multiple courses in Manassas and Woodbridge. Some may not want to cross over to the other county. It can take 40 minutes to get from Manassas to Woodbridge (and vice versa). Elderly patients at night may not want to drive. Other items may be the frustration with advertising and marketing. It also needs to be cost reasonable. Another item may be translational service. A significant population of the county may have a language barrier in understanding all of the course content. Perhaps the use of Promotoras- they are lay Hispanic community members that have been provided some training in diabetes. If properly trained, they may be able to mirror a class for Spanish speaking residents.
8	How would you recommend increasing the enrollment of Prince William County residents into the program?	Leverage health departments and free clinics for marketing, as well as county agencies and senior centers. Western Prince William County is growing very rapidly.
9	Aside from the current educational resources offered, are there other tools and materials you believe should be available to the class?	The materials provided are excellent. They provide handouts and information. I don't see any need at the moment for additional information.
10	In your opinion, what are the strengths of the LWwD program?	Nancy is engaging and a motivational educator. She is very passionate, so she hooks people in and connects with them. There are 4 different classes with a focus on food, which is great. Food is the primary focus. Lastly, everyone feels connected with why they are there.
11	Any other items you wish to share?	Diabetes education should have a big focus on support. What happens after you finish the program? People like interconnectedness. Not a support group but interconnectedness.

Worksheet 2: Living Well with Diabetes Post-Course Evaluation

There were (29) course evaluations received utilizing the Worksheet 2 template from June 2012 to June 2015. Seven of the ten questions were in open-ended format, while three were closed format questions (Tables 5-9).

Table 5

Most Enjoyable Aspects of the LWwD Program.

Category	Code	Description	Count	% of Codes	Theme
Food choices	Food labels	Reading labels	1	2.10%	Chose food preferences
Food choices	Nutritional information	Nutritional information	7	14.60%	Influences on food chosen
Food choices	Dining ideas	Health dining options	2	4.20%	Provided foods good/bad
Food choices	Recipes	Healthy recipes	2	4.20%	Healthy eating concepts
Food choices	Cooking tips	Other	1	2.10%	Healthy eating concepts
Class instruction	Instructor guidance	Instructor guidance	3	6.30%	Perceptions of health benefits
Class instruction	General information	General	5	10.40%	Perceptions of health benefits
Class instruction	Instructors	Course instructors	9	18.80%	Perceptions of health benefits
Class instruction	Portion control	Other	1	2.10%	Influences on food chosen
Class instruction	Susceptibility	Other	1	2.10%	Knowledge behavior gap
Social Support	Sharing ideas	Collaboration	3	6.30%	Social interactions
Social Support	People	Community	3	6.30%	Social interactions
Class deliverables	Class meals	Meals during class	8	16.70%	Environmental influences
Class deliverables	A1C testing	Other material	1	2.10%	Environmental influences
Class deliverables	Hand out materials	Other material	1	2.10%	Environmental influences

Table 6

Most Surprising Elements Learned During the Class.

Category	Category Count	Code	Count	% of codes	Themes
Food composition	11	Salt intake	2	5.70%	Influences on food chosen
Food composition		Carb intake	5	14.30%	Influences on food chosen
Food composition		Sugar intake	4	11.40%	Influences on food chosen
Food consumption	8	Number of meals	3	8.60%	Chose food responsibility
Food consumption		Calorie counting	4	11.40%	Food preferences
Food consumption		Dining out	1	2.90%	Food preferences
General Knowledge	7	Need for exercise	1	2.90%	Perceptions of health benefits
General Knowledge		Improved learning	4	11.40%	Knowledge behavior gap
General Knowledge		Label reading	1	2.90%	Food preferences
General Knowledge		Medications	1	2.90%	Health consequences
No answer	6	None	6	17.10%	None
Food recipes	3	Meal preparation	2	5.80%	Influences on food chosen
Food recipes		Planning	1	2.90%	Influences on food chosen

Table 7

Most Beneficial Aspects of the Program.

Category	Code	Description	Count	% of Codes
No Answer	None	None	2	5.40%
Food consumption	Carbs	Food preferences	2	5.40%
Food composition	Sugars	Food preferences	2	5.40%
Food Preparation	Types of food	Healthy eating concepts	3	8.10%
Food Preparation	Recipes	Healthy eating concepts	5	13.50%
Food Preparation	Meal planning	Healthy eating concepts	4	10.80%
Food intake	Calories	Healthy eating concepts	2	5.40%
Food intake	Portion sizes	Healthy eating concepts	7	18.90%
Food intake	Label reading	Healthy eating concepts	8	21.60%
Food intake	Meal frequency	Healthy eating concepts	2	5.40%

Table 8

Unmet Needs of the LWwD Program Graduates.

Category	Code	Description	Count	% of Codes
No answer	None	None	9	27.30%
No answer	Other (N/A)	None	2	6.10%
Mitigate symptoms	Disease reversal	Health consequences	5	15.20%
Mitigate symptoms	Glucose management	Health consequences	2	6.10%
Healthy lifestyle behaviors	Exercise	Roles and responsibilities	3	9.10%
Healthy lifestyle behaviors	Medicines	Roles and responsibilities	3	9.10%
Healthy lifestyle behaviors	Food intake	Roles and responsibilities	3	9.10%
General information	Refresher classes	Knowledge behavior gap	4	12.10%
General information	More information	Knowledge behavior gap	2	6.10%

Table 9

Least Enjoyable Aspects of the LWwD Program.

Category	Code	Description	Count	% of Codes
No Answer	None	None	9	31.00%
Enjoyed class	Enjoyed everything	None	10	34.50%
Classroom	Room temperature	Non-influencing factors	2	6.90%
Classroom	Sound/noise	Non-influencing factors	2	6.90%
Session offering	Class ended	Non-influencing factors	2	6.90%
Session offering	Commute	Non-influencing factors	2	6.90%
Non-class related	Other	Non-influencing factors	1	3.40%
Non-class related	Severity of disease	Non-influencing factors	1	3.40%

Worksheet 3: Living Well with Diabetes Post-Course Evaluation (January 2016)

In January of 2016, the post-course evaluation was offered to participants in electronic format through SurveyMonkey (Palo Alto, CA). The electronic version consisted of eight open and closed-ended formatted questions. Links to the post-course evaluation were distributed through emails to the class participants at the conclusion of the Fall 2015 LWwD program. Twenty-four individuals completed the evaluation (Tables 10-12). All individuals who had previously completed the LWwD program were also invited to participate in the survey. This survey was not limited to a particular class session. As such, there may have been individuals included in this survey that have already completed a previous version of the evaluation.

Table 10

Perceived Positive Lifestyle Changes From the Program.

#	Answer	Min Value	Max Value	Average Value	Standard Deviation	Responses
1	Meal and Snack Planning	10.00	100.00	67.04	21.81	24
2	Grocery Shopping and Reading Food Labels	11.00	100.00	70.65	26.25	23
3	Eating Out	10.00	100.00	58.29	30.29	24
4	Physical Activity	10.00	100.00	59.29	25.30	24
5	Stress Management	7.00	95.00	56.13	22.59	23
6	Understanding and Following Medication Instructions	3.00	100.00	66.91	26.87	23

Table 11

Recommended Number of Program Classes From Participants.

#	Answer		Response	%
1	3 and a follow up		5	36%
2	5 and a follow up		4	29%
3	6 and a follow up		5	36%
	Total		14	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	2.00
Variance	0.77
Standard Deviation	0.88
Total Responses	14

Table 12

Participant Support for Email Usage to Provide Nutrition Education.

#	Answer	Min Value	Max Value	Average Value	Standard Deviation	Responses
1	Slide bar to select how helpful	32.00	100.00	87.00	18.17	23

Recruitment- methods for recruiting new participants to the program. All three respondents indicated that flyers were distributed at various county locations and sponsored events across the community. One respondent indicated that participants are also recruited from health care referrals. Previous advertising was available through local community and county newspapers, but the subject wasn't sure if the newsprint outlet was still operational.

Two of the educators identified the need for more extensive methods of program marketing. This included advertisements at various supervisor buildings, marketing at local health fairs, and a presence at health departments and free clinics. Additionally, the rapid growth of the senior community in Western Prince William may present additional recruitment opportunities. Another recommendation suggested alterations to the current curriculum. One example provided was to host cooking classes in conjunction with the LWwD program to allow learners to actively participate in meal preparation. This may be accomplished by either extending class sessions, or adding classes to the course syllabus. Cooking classes could also include instruction on how to grow a fresh vegetable garden.

Participants were asked how they found out about the Living Well with Diabetes course. Twenty-eight (96.6%) of the participants responded to question 10. The three categories assigned to survey answers included county resources, friends and family, and marketing material. Six (21.4%) of the assigned codes described the information available through the county website, service desk, and through discussion during other county sponsored classes. Fifteen (53.6%) codes were assigned to the Friends and Family category. Eleven participants learned about the program from a friend. Four respondents were introduced to the program through their spouse. The Marketing Material category was comprised of codes describing knowledge of the LWwD program through flyers and emails. Seven (25.2%) of responses were categorized under Marketing Materials.

Barriers to the LWwD program. All of the program educators identified diabetes education as the greatest barrier to effecting lifestyle changes. Participants require education to know what they need to incorporate changes in their daily routine to improve their overall health. Other responses were as follows:

- The access to change, determined by both financial resources and time management.
- Ease of food availability. Pre-packaged foods are often too convenient to obtain.
- People tend to be stuck in their ways. It's difficult to break a routine that has existed for many years.
- Newly diagnosed individuals may feel scared and threatened in learning about the complications of diabetes.

There were 20 (69%) program participants responded to question six (Table 9). Learners were asked to identify the things that they least enjoyed about the class. Ten (65.5%) responded that they enjoyed everything about the class. Two (6.8%) individuals responded that they did not want the class to end. Four (13.8%) identified the classroom physical environment as the least amount of program enjoyment. This included both ambient room temperature (*n*=2) and room noise level/presenter voice during lectures. Four 'other' responses that were recorded that identified singular responses describing the unpleasant feeling of finger sticks for hemoglobin A1C draws, the traffic commute to attend class, and the perceived severity of diabetes-related complications.

Participants identified areas that they believed they still needed to learn about Diabetes after the program was complete. There were 20 (68.9%) of the participants that provided an answer to question five (Table 8). Additionally, there were two participants that entered 'none', indicating there they did not feel there were any additional elements they needed to learn about diabetes. There were three categories for the reminder of responses (*n*=18, 62.1%) that included Mitigating Symptoms, Managing Healthy Lifestyle Behaviors, and General Information. Codes assigned to the Mitigating Symptoms included disease reversal and improved glucose management. Seven (21.3%) of the survey responses were attributed to the Mitigating

Symptoms category. Healthy Lifestyle Behaviors was associated with nine (27.3%) of the survey respondent codes. This category included codes assigned to individuals that believe they need additional information on proper physical activity, medications, and diet. General Information, six (18.2%) of responses, was categorized by codes that described both the general need for information and the opportunity for refresher courses.

Implementation- participant response to the LWwD program. Program educators believed that the majority of class participants were responding well to the program. This was perceived through positive comments from the class, instances of active engagement of the learners, and complimentary emails received after the conclusion of class. One educator believed that on occasion a few participants may still need additional mentoring on with carbohydrate counting and meal planning. However, these individuals still have significantly improved their overall knowledge of dietary guidelines by the end of the program.

Class participants were asked what information that they acquired during the program would be of most benefit to them. Identifying the most beneficial elements of the program would help assess the quality of the intervention received by the class graduates. Twenty-seven (93.1%) of the participants responded to this question (Table 7). There were three categories that defined the survey responses that included Food Composition, Food Preparation, and Food Intake. Food Composition included four (10.8%) of the total code responses. Codes within this category were comprised of carbohydrate and sugar information that will provide the most benefit to participants. The Food Preparation category, 12 (32.4%) of responses, captured codes assigned to identifying the proper types of foods, health recipes, and meal planning. Food Intake was associated with 19 (51.3%) of coded responses. Assigned codes included appropriate portion sizes, label reading, and frequency of meals.

Class respondents also responded that they would recommend the LWwD program to others. Twenty-eight (96.6%) participants responded to question 8. This question was a closed-ended question in yes/no format. One respondent did not respond. All respondents indicated that they would refer others to the LWwD program.

Learners were asked to score each of the lifestyle behaviors based on their perceived level of positive change since participating in the LWwD program. Sliding scales were used to rate their rate of lifestyle change in each category from 0-100, with 0 reflecting no change, and 100 indicating complete change in behavior (Table 10). All six lifestyle behaviors were associated an average increase value of positive change of at least 56%. Grocery shopping and reading food labels was identified as the behavior associated with the highest average degree of lifestyle change.

Participants were asked if they experienced weight loss as a result of attending Living Well with Diabetes? All twenty-four participants responded to Question seven in short answer format. Seventeen individuals (70.8%) reported that they lost weight as a result of participating in the program. There were six respondents that did not report weight loss. One respondent who participated in the program as a resource to her spouse was omitted from analysis. Additionally, respondents were asked if their A1C number went down as a result of attending Living Well with Diabetes. Twenty-three responses were analyzed from question eight. Fourteen (60.8%) respondents reported a decrease in their hemoglobin A1C values after course completion. Three individuals (13.1%) did not report a reduction in A1C value. Two individuals were unsure of their A1C value, and four respondents were spouses and caregivers of diabetic participants and did not test their A1C values. Omitting the support people from analysis yielded a reported decrease of A1C values in 74% of participants.

Context- factors influencing program delivery. Each of the three interview subjects provided significantly different answers in identifying the contextual and environmental factors that may influence program effectiveness and delivery. One respondent indicated that people need to feel compelled to take action in their diabetes management. This was described by another as a need for individuals to improve their self-efficacy and motivation. People are seemingly inundated with foods that provide instant gratification such as processed and fast foods. Participants may not have the motivation or capability to commit to life-long behavioral changes. There were also several other environmental influencers identified that could limit program effectiveness. Meeting location may limit elderly residents from traveling across the county to attend the live sessions. The recent class sessions have been held in Woodbridge, which may be up to a 40-minute commute time from Western Prince William County. There could also be limits to marketing and advertising for the program. The costs associated with more extensive marketing campaigns may be a contributing factor to lower class enrollment rates. Lastly, there may be a potential language barrier for county residents that may consider enrolling into the program. The use of Promotoras, lay persons that speak Spanish and have some education in diabetes, may offer the Spanish-speaking residents an opportunity to participate in the program.

Facilitators of the LWwD program. There were several perceived facilitators identified across the program. These facilitators were provided as follows:

- The Program Director is engaging and a motivating educator. She is passionate, and hooks people in and connects with them.
- Each of the four unique classes subjects all relate back to food. This is unlike some of the other lifestyle education programs. Food is the primary focus.

- Everyone feels connected with why they are there.
- The program is hands-on.
- The participants feel good about coming to class. They feel welcomed and encouraged to know that diabetes doesn't necessarily mean that all foods are forbidden.
- The program is helpful if people are willing to listen.
- Classes help associate healthier eating habits to lower blood pressure, cholesterol, and diabetes complications.
- The Program Director does a beautiful job with the class. The county needs to wake-up and realize the benefits of the program.

Class participants were asked what they enjoyed most about the program (Table 5). All open-ended answers were coded for categorized for analysis. The open-ended format of the question allowed for respondents to provide more than one answer. There were fifteen codes assigned to all of the survey answers. These codes were then assigned to four thematic categories including Food Choices, Class Instruction, Social Support, and Class Deliverables. The Food Choice category was comprised of codes including reading food labels, nutritional information, dining ideas, recipes, and cooking tips. Thirteen response counts (27%) associated Food Choices as the strongest aspect of LWwD class. The Class Instruction category included codes pertaining to instructor guidance, general information, and instructors. There was an 'other' category created to capture singular entries of portion control and perceived susceptibility to diabetes. Class Instruction was identified in nineteen (39.7%) of survey codes. Social Support was defined with codes describing both the sharing of ideas in class, and the people involved in the program. Six respondents (12.6%) identified Social Support as an enjoyable factor of the program. Class deliverables was identified as materials and tangible benefits of the program. Eight Respondents

identified the meals offered during the class as enjoyable aspect of the program. Other codes included single counts such as hemoglobin A1C tests and hand-out lecture materials as enjoyable benefits. Overall, Class Deliverables was associated with six (12.6%) of enjoyable responses.

Question twelve asked participants to rate the courtesy and professional demeanor of the course instructors. Selections were limited to excellent, good, fair, and poor. All twelve respondents rated the level of professionalism and courtesy as 'excellent'.

Question five asked participants if receiving emails with links to nutrition education was helpful to them. Twenty-three (95.8%) participants ranked the value of broadcast emails sent by the program director on links to nutritional web resources on a scale ranging from 0-100 (Table 12). The average participant score was 87, with a standard deviation of 18.17. Participant scores ranged from 32-100.

Implementation- is the program being delivered as intended? Results from the post-course evaluation indicate that all of the program participants (n=29) believe the date and time of the course offerings were convenient for them to attend the program. Although one individual expressed concern with local traffic during the commute to class, they concluded that the time of day was still convenient for them to attend. Weekly classes were held for a period of four weeks.

Two-hour sessions were delivered according to the course syllabus. Course lecture topics and activities were consistent with the intended delivery of the program. A follow-up session was held approximately three months after the completion of each of the education sessions. Hemoglobin A1C assays readings, group discussions, and a guest speakers was provided for each course session. Locations of the class sessions were held according to the course registration form.

The fidelity of the program was also assessed in question nine of the course evaluation. Individuals were asked to rate the level of improvement in their knowledge based from participating in the program. Twenty-eight (96.6%) of participants responses were collected. This question was in closed-ended format with selections including 'improved substantially', 'knowledge level about the same', and 'did not improve'. Twenty-four (83% of respondents) indicated that their knowledge improved substantially. This did not include one respondent that edited the answer to read 'increased somewhat'. Three (10%) respondents reported that their knowledge level remained the same.

The quality of the intervention was also assessed by the perceived satisfaction of the program participants. The June 2013 course evaluation began incorporating two additional closed-format questions. Question eleven requests participant to rate their satisfaction level with the class. Selections were limited to excellent, good, fair, and poor. Of the twelve evaluations completed, ten (83.3%) rated the class as 'excellent', and two (16.6%) rated it as 'good'.

Participants that completed the January 2016 post-course evaluation were asked if the behavior models presented in the program curriculum helped them understand how to better make their own behavior change. Twenty-two participants (91.7%) responded to question 1 in closed format (yes or no). All participants reported that they believe the behavior change model concept helped them understand making behavior change.

Implementation- program exposure to the participants. Question three of the January 2016 evaluation asked participants the ideal number of of sessions for the course program. Fourteen participants (58.3%) responded to question 3 (Table 11). Five respondents (36%) indicated that three sessions and a follow-up would be an appropriate class length. Four (29%) of respondents believed that five sessions and a follow-up would be an appropriate length. Five

individuals (36%) responded that six sessions and a follow-up would be an ideal class length. Question four was an open-ended question asking participants to identify any additional session topics to the program. Seven respondents (29.1%) completed the question. Singular answers were not able to be coded for discrete analysis. Suggested entries included more instruction on reading food labels, more time for class questions, classes dedicated to exercises and physical movements, and additional support for making changes.

Chapter 6: Discussion

Specific evaluation questions were designed to guide the evaluation process and provide information that can be used to improve the overall delivery of the LWwD services. Information ascertained from the LWwD session resources, interviews from volunteer program educators, and post-course evaluation results from program participants were used for analysis and reporting. Each of the following evaluation questions identified essential elements of the LWwD objectives and infrastructure.

Is the LWwD Diabetes Program being delivered as intended?

Fidelity may be defined as the extent to which the program's interventions adhere to the proposed targeted outcomes. Since 2012, at least two sessions have been conducted without interruption during both Spring (March and April) and Fall (October and November) calendar months. While course materials have been continually updated each offering, the overall course syllabus session topics have been consistent with the West Virginia Dining with Diabetes (West Virginia University Extension Service, 2014) model during this time. Session objectives have consistently emphasized proper dietary regimen, diabetes physiology and management, meal planning and eating out solutions. Other lifestyle modification programs including the Group Lifestyle Balance, Structured Individual-Based Lifestyle Education program, Diabetes Interactive Education Program are similar examples of community-based wellness programs that have demonstrated significant improvements in delaying the onset of severe disease symptoms. Adherence to the proposed curriculum in these validated programs is essential in optimizing the positive impacts in program delivery. The use of post-course evaluations among both participants and educators would help identify whether the activities of the program met the

proposed goals. Overall, the LWwD program is being delivered as intended by the course curriculum.

How much exposure are the LWwD participants receiving in the program?

The LWwD course curriculum was designed to offer four, two-hour sessions. This results in a total of eight direct contact hours. This does not include the three-month period between session four and the follow-up session and guest speaker, resulting in a total of 10 contact hours. Again, this format was consistent with the original West Virginia program. While the results concluded that 162 people registered and completed the LWwD program, we were not able to determine whether each participant attended all of the course sessions. Attendance lists for each class session were not available for review. There was an average of twenty-seven people per year who registered for the course. Accessibility for participants during this time varied between the Manassas and Woodbridge class locations. There also seemed to be individuals that reported they have taken the course on more than one occasion. There is no limit on the number of times a person can register for the program. According to the post-course evaluations, there were two individuals that repeated the program. There were also a few responses from participants indicating that they were considering repeating the program in the future. An increasing number of return registrants would not only increase the dose of program received, but may also confer long-term health benefits from continued education and support. Two of the areas of greatest concern to diabetics were the changes in diet and physical exercise necessary for successful self-management. Khunti et al., (2012) concluded that ongoing education in diabetes management was associated with long-term biomedical benefits. Although the number of repeat registrants did not represent a significant portion of the program participants, monitoring the positive changes in health of these people may offer important information regarding the ideal number

and duration of the course sessions. The most recent course evaluation concluded that the majority of respondents would support five class sessions and a follow-up session for the program. Some of the participants believed that an additional time spent on reading food labels, answering class questions, instruction dedicated to exercises and physical movements, and additional support for lifestyle changes would increase both the quantity and quality of the program.

The primary method of instruction is interactive lecture. Informal and carefully prepared oral presentations are interspersed with participation from the audience. This method of instruction has several theoretical advantages. First, it is suitable for group sizes consistent with the number of LWwD participants. This method appeals to learners who prefer to engage in discussion rather than just take notes and listen. Two of the educators indicated that one of the strengths of the program was the ability to foster a welcoming and interactive environment for the learners. By supporting active methods of learning, participants may feel more confident and empowered to make significant lifestyle changes. Another benefit of this method is the opportunity for learners to share accounts of personal experiences with diabetes. This was also identified as a course strength, as the learning environment was perceived by faculty to have a strong interconnectedness among participants.

Demonstration was also observed as an important instruction method identified by both the faculty volunteers and participants. Demonstration helps illustrate a new behavior to the learner with time provided to discuss and carry out the observed task. This method was beneficial for participants with respect to reading food labels. Examples of proper food label reading are provided in class, followed by learner demonstrations supervised by the program director. Participants revealed that they felt more empowered in their ability to interpret the nutritional

content from food labels. This was the category associated with the highest reported prevalence of positive change. Similarly, results from the previous evaluation template indicate that knowledge in food intake consumption and label reading was also the highest reported area of information benefit (19 responses, 51.3%). Despite the recommendation from the participants that additional course content with food label reading should be added to the curriculum, the ability to analyze a food label gave them the highest degree of confidence.

Demonstration techniques were also applied to healthy cooking and meal preparation. Each session is accompanied by a light, three-course meal prepared during the session. The volunteer chef describes all of the ingredients and cooking steps for preparing each dish. Program participants are provided servings for tasting and recipes in class to encourage them to to trial the dishes at home. Several participants indicated that the class meals were the most enjoyable aspect of the program. According to the proposed curriculum, the number of course sessions with label reading and light cooking was consistent throughout the evaluation period, participants believed that increasing their exposure in these areas would yield a significant benefit in both self-efficacy and motivation.

How many individuals are affected by the LWwD program?

The six-year reporting period (2010-2015) from the registration database concluded that 162 individuals registered for the LWwD program. While registration was not restricted to county residents, the majority of participants reside in districts within the Prince William County boundaries *(Figure 2).* There is a strong concentration of participants (n=75, 46.3%) that reside in a five-mile radius of the course site locations in Manassas and Woodbridge. Many of the other districts in the county are significantly less represented, suggesting that the program has a limited reach across the remainder of the county and larger Northern Virginia region. This may

suggest that both local advertising and distance to travel may be limiting factors in enrollment. One of the program educators believed that unbalanced geographic distribution, access to travel, and marketing were all factors associated with influencing program effectiveness and delivery.

The number of residents served by the LWwD program represents only a small fraction of residents that can directly benefit from diabetes lifestyle education. According to the United States Census Bureau (2014), 446,000 individuals reside in Prince William County. Conservative estimates using a diabetes prevalence rate of 8% would indicate that nearly 36,000 county residents currently live with diabetes. This would suggest that the LWwD program serves less than one-half of one percent of residents living with diabetes. This figure does not include those individuals that have not been diagnosed but are considered at high risk of acquiring diabetes. In the absence of significant growth and support of diabetes wellness programs, there will be a greater proportion of underserved county residents suffering from a seemingly preventable chronic illness. The rapid population growth across the county, particularly in the senior population, will only increase the prevalence and impact of disease. Further, the county fails to meet national benchmarks of other health indicators associated with diabetes such as lack of physical activity, prevalence of obesity, lack of access to health foods, and high costs of healthcare services. Expanding the reach of the program across the county would result in significant gains in the overall health and safety of these communities. Clinicians that were surveyed in the DAWN-2 trial believed that patients with diabetes need to improve their self-management techniques (Stuckey et al., 2015). Given the current limitations on program reach, the broader community is unable to realize the gains in diabetes prevention and wellness initiatives. Although the program is currently reaching individuals diagnosed with

diabetes, there may be future opportunities to consider expanding services beyond these concentrated areas of the county.

What are the participant characteristics of the LWwD program?

The number of registrants and characteristics of each of the participants help define the reach of the program. While the number of people served is an important measure of performance, demographic analysis would help determine if the class participants were representative of the overall affected community. Participants in the class were comprised of individuals that are diagnosed with diabetes, considered at elevated risk of acquiring diabetes, or are spouses, friends, and caregivers of diabetic individuals. Geospatial analysis (Figure 2) demonstrates that districts in the immediate area surrounding the class site locations represent the highest proportion of participants. While only one participant identified commute time and traffic as a program limitation, the current resources are unable to appreciate the number of individuals that are interested in the program but are otherwise unable to attend in person due to venue location. Interestingly, there are several program participants that reside outside the Prince William boundaries in neighboring counties that commute longer distances to attend class (Figure 2). These counties included Fairfax, Fauquier, Stafford, Spotsylvania, and Culpepper. While most of these counties are represented by only one or two of the total individuals in the database, their participation should not be underestimated. The LWwD program in Prince William is the only advertised community-based diabetes wellness program in the Northern Virginia Metro Region over 2.8 million residents. INOVA Health System (2016) of Northern Virginia holds a Living Well with Diabetes Program (previously known as the Diabetes Basics Course) that consists of 2-two hour classes with no follow-up session. Registration for the course requires a physician's order and health insurance clearance, which may preclude many residents from participating in

the program. Support groups and education services are available through other health care facilities, but most are not as comprehensive and freely available for residents in the region. As such, the Living Well with Diabetes program in Prince William County could benefit even greater number of individuals across the entire Northern Virginia Region.

The program registration forms do not collect data on other demographic variables of interest. Other data elements that would help describe the characteristics of program participants would include but not be limited to:

- Age
- Gender
- Race
- Years since diabetes diagnosis
- First language

Stratifying data by these independent variables may help associate class enrollment with various marketing and advertising campaigns. Course curriculum may also be customized to ensure the needs of the learner.

What recruitment methods are bringing new participants into the program?

Recruitment is paramount in expanding the reach of the impact of the program. The results gathered from the post-program course evaluation (Appendix C) were coded into three categories. Several individuals learned about the program through county services. Reported county outlets included the county website portal, flyers at the county building, and promotion through other county hosted community classes. Others heard of the program through similar marketing materials such as program flyers and email broadcasts. However, over half of the participants were initially exposed through word of mouth of friends and family. The majority of

these conducts were from friends and work colleagues. Several other respondents reported that they learned about the program through their spouse. This was a consistent observation by the program educators. The use of flyers was still viewed as an important adjunct to marketing. However, educators agreed that word of mouth and self-referrals are still the key to recruitment. This may suggest that individuals perform their own investigation to identify educational and support resources for their disease care and management. Additionally, healthcare providers at local medical care facilities may recommend the program to their patients. At one point in the organization, local community newspaper advertisements were once used as program marketing strategy. However, the current subscriber circulation and availability is unknown. Since diabetes affects a disproportionate amount of individuals across gender, race, and socioeconomic status, recruitment activities must employ a multi-modal approach to ensure vulnerable populations are adequately represented (Sadler et al., 2005). With a growing population of minority and foreign-born residents in the county, culturally sensitive strategies should be identified to address the needs of under-represented communities.

What quality of intervention is received by the LWwD participants?

Determining the quality of the intervention received by the participants helps measure the fidelity in the program. The majority of participants believed that their knowledge of diabetes increased substantially as a result of the program. These reported cognitive improvements would increase one's belief in their ability to make healthy lifestyle changes. In this context, one's self efficacy is important in determining how well the participant will adapt to new behavior modifications. Further, participants would also recommend the LWwD Program to other individuals diagnosed with diabetes. This would indicate that the majority of respondents believe the quality of the program is high enough to personally recommend to others.

Among the best indicators for program fidelity are reported changes in lifestyle behaviors and or perceived improvements in health status. Approximately two-thirds of all respondents reported a greater confidence in healthy meal and snack selections, grocery shopping and food label reading, healthy eating out solutions, physical activity and exercise, stress management, and a better understanding of medications. While there is not a clear association in this survey between improved decision-making and health outcomes, may respondents did report improvements in physical health indicators. Respondents to share their changes in weight loss and serum hemoglobin A1C values. The majority of respondents indicated they lost weight since participating in the program. Respondents also reported decreases in their hemoglobin A1C values since program launch. Hemoglobin A1C is a useful measure to determine the effectiveness of diabetes management during the previous three months leading up to sampling. Therefore, the A1C value would indicate whether the instruction that was provided during the course sessions translated into lifestyle decisions. Significant decreases in serum A1C values from baseline may be explained by positive changes in behavior modifications that have allowed for improved diabetes control. The results can be aligned with the participants' reported lifestyle changes to measure the direct benefits of the program. Although an outcome evaluation is outside of the scope of this research project, these outcome measures may explain the quality of the program that was received by participants.

How well are LWwD participants responding to the LWwD program?

Implementation is a core concept that would describe how well participants are responding to the program. Several of the evaluation indicators were used to define the level of participant response and satisfaction. All of the educators that were interviewed believed that program participants are responding very favorably to the program. This common belief was based from

positive comments received from the leaners, the perceived seriousness that learners exhibited during class, and unsolicited email feedback received from the class indicating their satisfaction with the program. This was supported by the results of the post-course evaluations. All respondents rated their level of satisfaction with the class as either 'good' or 'excellent'. When asked to identify what areas of the program they 'least' enjoyed, only a few responses specific to the physical nature of the classroom were provided. Therefore, participants responded favorably to the course curriculum and the delivery of the content. This may be a reflection of the quality of the program, but it could also be representative of the individual's stage of change. The Transtheoretical Model (TTM) suggests that individuals move through a series of stages when modifying lifestyle behaviors. Before a person poised to take action, they have to contemplate their desire to change. Participants may have entered the program already preparing themselves to action. The LWwD program may be providing them the knowledge and confidence to foster effective change. Newly-diagnosed individuals may still be in the precontemplation stages and avoiding the thought of lifestyle changes. Collecting data regarding the time since diabetes diagnosis may help determine if it is predictive of the intent to change. Furthermore, identifying such an association may allow educators to improve implementation and help participants meet personalized goals.

Which programs interventions are more effective than others?

Implementation was also analyzed by identifying what areas of the program the participants believed were more effective than others. Among the highest reported categories that were coded included food intake and food preparation. Food intake included the ability to read food labels, determining proper portion sizes, and recommended meal frequency. Food labeling reading was the highest reported code in this category. Session two of the program focuses on

how to understand and use the nutritional facts labels across multiple learning domains. A holistic approach to learning suggests that the highest effective learning experiences incorporate numerous learning styles. In this instance, cognitive learning allowed for participants to think about the proper elements in healthy food labels. Psychomotor learning tasks provide participants the opportunity to demonstrate their knowledge of health label reading to the class. Lastly, the affective domain encouraged participants to gauge their feelings on whether various processed foods were worth consuming. Participants reported significant benefits in their ability to determine nutritional value of available foods, as well as plan for the timing and amount of food to consume. Food preparation included the types of suggested diabetic foods, access to healthy recipes, and meal planning. Healthy recipes were disseminated to participants both in the course binder materials and the cooking demonstrations during sessions. Hence, the ability to identify healthy foods and prepare them with natural ingredients seem to provide the greatest perceived benefit for participants.

Are there contextual factors that influence program effectiveness and delivery?

The context of the program helps describe the circumstances that form the learning environment in terms of what can be understood and measured. This question was not posed directly to the participants via the post-course evaluation, however, respondents were asked to provide their most enjoyable aspects of the program. Approximately 40 identified class instruction, which included guidance from the instructor, the sharing of general information, and the teaching ability of the faculty instructors. Compliments and high scores for faculty instructors resonated throughout the survey results. An instructor's ability to deliver information in a manner that encourages the learner to receive and apply that knowledge productively is the

hallmark of successful healthy lifestyle modification programs. As such, effective instructors would influence the program effectiveness and delivery in a positive manner.

During the educator interviews, all three respondents identified contextual areas that may limit the effectiveness of the program. One respondent discussed the geographic boundaries that separate the Eastern and Western areas of the county. Marketing of the program under the perceived current resources was also identified. Environmental factors were also described. In particular, the ease and instant gratification received by quick and easy fast foods choices in the community could deter individuals from committing additional time and money necessary to help promote healthier diets.

What are the facilitators of the LWwD program?

All of the available sources of data for this evaluation identified perceived facilitators of the LWwD program. Educators believed that the program director is an engaging and motivated educator. Her passion for teaching fostered a learning environment that participants felt provided great social support. Since many of these individuals may have been newly-diagnosed with diabetes, providing support and interconnectedness throughout the course could be invaluable to learning and behavior change. One educator felt that participants that were scared to participate or had feelings of threat may represent one of the greatest barriers to individual success in the program. Six respondents of the post-course evaluation believed that Social Support systems were among the most enjoyable aspects of the course. Emotional detachment from the learning environment may significantly limit the participant's ability to benefit from the program.

Another perceived facilitator of the program was the incorporation of food throughout the curriculum. Every session topic related back to diet and food. A healthy diet is considered one

of most modifiable lifestyle changes for people diagnosed with diabetes, yet, it may be one of the most difficult to sustain. While medications, physical exercise, and stress management are all considered primary predictors for diabetes-associated morbidity, a healthy and well balanced diet is the proverbial backbone of effective disease prevention. Program participants believe recognition of proper food choices and consumption are the most important aspects of the programs. Food as the primary focus is not commonly shared with hospital-based programs in the region (INOVA Health System, 2016). Courses are often truncated to fewer sessions with less of an emphasis on diet, and more time allocated to medical management.

Cost and availability are significant facilitators of the program. Unlike many hospital-based programs, program registration is unrestricted to the community. Participation does not require a physician referral or a billing claim to health insurance. Such requirements may disproportionately affect individuals in low-income households that do not have proper access to medical care, or the money to pay for physician co-payments and insurance deductibles. Like many other chronic diseases, the discrimination due to treatment costs may exacerbate diabetic symptoms in later stages of life that may have otherwise been avoidable with improved prevention education. Similar findings were reported by Cadzow and colleagues (2014) during a program evaluation of a "Living Diabetes Well" program in Buffalo, New York. The program served vulnerable residents in high-poverty neighborhoods by using health advocacy agents to deliver information about diabetes across the community. These 'Health Talkers' were able to reach > 700 people that may have been otherwise been unrecognized to the medical clinical community. The adaptation of the community-based GLB program in Western Pennsylvania demonstrated that diabetes prevention support services can be successfully applied across urban, suburban, and rural regions to reduce the risk of metabolic and cardiovascular diseases. The cost

of the Prince William LWwD program is $50.00. A reduced fee of $35.00 is provided to SNAP recipients, Free Clinic, and Greater Prince William Community Health Center patients. A fee of $25.00 is administered to spouses, family members, case workers, or caregivers of people with diabetes. Program participants are also not restricted from taking the course more than one time. Several participants indicated that they have either taken the course before, or plan to register again in the future as a refresher course.

What are the barriers of the LWwD program?

There were several perceived barriers identified during the evaluation that extend our multiple domains of the program. First, there are presumed barriers at the individual leaner level. Educator interviews indicated that some participants may be too stuck in their habits to make meaningful changes in lifestyle. They must first understand their perceived susceptibility and severity of disease before they are motivated to make change. As one faculty member shared, "they need to name it, claim it, and know the importance of it". Although it is the role of the instructor to help participants appreciate the severity of diabetes, efforts to scare them to change may be counter-intuitive to their learning. They must first gain the education necessary to know they need to change. This may be compounded by the time and financial resources to change. Some individuals may not be able to work around their work schedules to attend the sessions. The investment of time to plan and prepare meals may provide an even greater challenge. Pre-packaged and refined foods provide instant access to meals. Many recipes for healthy eating may be more time-consuming at inconvenient times during the day. Moreover, many people may save time by stopping at fast food or convenience stores to eat on the go. The financial impact of eating healthier foods should also not be overlooked. Individuals residing in low income households may not be able to easily afford fresh fruits, vegetables, and natural

ingredients. As the population of senior-aged residents continues to grow across the county, many may be on a fixed income and find fresh grocery shopping difficult.

Environmental challenges to the program involve the choice of course location in the county. The Woodbridge and Manassas districts comprise 46% of the LWwD participants. Over 40% of the total program registrants live within a five-mile radius of the Woodbridge class location. Since the course has been offered recently in Manassas, participants living in Western Prince William must commute Woodbridge for class. There are many surrounding areas that may be inadvertently underrepresented due to limits in the reach of marketing campaigns and the distance to travel. Only one of the 29 participants indicated that the commute and traffic were significant concerns. What is not fully appreciated is the potential denominator for class applicants; those individuals that struggle with diabetes and are either unware of the program, or are unable to secure transportation.

Financial constraints of the program may also provide a significant challenge to the existence of the program. Two of the faculty volunteers expressed concern that the resources may not be available for activities such as the expansion of marketing strategies and operations to meet the growing needs of the county. As previously mentioned, the senior and minority demographics are the fastest growing populations in the county. Additional resources should be considered to not only increase the number of supported courses offered, but to offer language services that are more inclusive to minority groups.

Chapter 7: Strengths and Limitations

Strengths

Qualitative research and coding provides a valued benefit to study researchers (Vaughn & Turner, 2016). First, it allows the researcher to gain a deeper understanding of user needs with specific details. It identifies specific context which can lead to the creation of new services. It compliments quantitative findings with user perception, and builds a closer relationship with users (Vaughn & Turner, 2016). The use of thematic analysis allowed for themes to emerge from the evaluation. Some of the perceived strengths are consistent with the advantages of thematic analysis reported by Saldana and Benasolli (2013). First, the flexibility of developing codes after the data has been reviewed allows multiple ideas and theories to emerge from the data. The categories developed for the participant evaluations were built on the accumulating responses collected, and not based on preconceived assumptions prior to the data analysis. Themes that were aligned were grouped under categories for further analysis. In this evaluation, the use of thematic coding was instrumental in categorizing the evaluation responses from the class participants. Many of the respondents identified more than one area for the evaluation question, therefore, there were more coded responses than individuals participating in the evaluation. Developing categories of analysis permitted the translation of qualitative data in the participant format into a quantitative format to best answer the evaluation questions.

The post-course evaluations were well designed and comprehensive. I was able to create specific process evaluation questions that could be answered using the majority of retrospective post-course evaluation results. The question rubric employed both open and closed format questions. The closed questions were relatively easy to interpret, and the short answer structure of the open questions allowed for coding and categorization. Participant evaluation questions

closely followed the key constructs of the Social Cognitive Theory. The theoretical underpinnings of the LWwD Program are grounded in the Social Cognitive Theory. According to Bandura (2001, 2002), learning and lifestyle changes are influenced by an individual's past experiences (personal factors), the social environment, and the targeted behavior. Unlike many other theories of behavioral change, the Social Cognitive Theory identifies both the initiation of behavior as well as the reinforcement and maintenance of the desired behavior. Each of the key constructs are essential components of the program infrastructure and desired behavioral modification (Office of Behavior and Social Science Research, n.d.; Glanz, Rimer, and Viswanath, 2008; Glanz and Bishop, 2010). Observational learning posits that individuals can acquire new behaviors from the direct observation of others. During class, the volunteer chef demonstrated how healthy meals can be prepared from a few natural ingredients. Class participants demonstrated their ability to review and describe the nutritional content from various packaged food labels. Reinforcement suggests that internal and external factors define the extent of behavioral change. Each of the class sessions were designed to help reinforce healthy diabetes-related behaviors. Learners were encouraged to describe healthy shopping lists, discuss proper meal planning, and identify sensible solutions for eating out. Self-Control refers to the learner's ability to self-monitor their progress in behavioral change. This construct was consistent throughout the duration of the program. Students were encouraged to monitor their intake of carbohydrates, fats, and proteins in a daily meal diary. Self-monitoring also included physical activity, as the use of pedometers were recommended to record daily step goals. The pedometers served as motivators and reminders to maintain daily physical activity. Lastly, Hemoglobin A1C values were collected and reported at the beginning and at the three-month follow-up session to motivate individuals to maintain control of their diet and exercise regimen.

Self-efficacy was assessed by questions that asked respondents to indicate their level of improvement in making positive lifestyle behaviors as a result the program. Another question asked participants if the explanation of the Transtheoretical Model (TTM) of Change during class aided in the learner's ability to adopt behavioral changes. The TTM model gauges a person's self-efficacy by weighing the pros and cons of new behavioral changes as they progress from action to the maintenance and reinforcement stages. Other questions assessed the participants' expectations of behavioral change. One example is a question asking what type of information shared in the program was of most benefit to the learner. Other questions aimed to determine the effect of the program through changes in biometrics. Respondents were asked if the program resulted in weight loss and a decrease in serum hemoglobin A1C values. While this was not designed as an outcome evaluation, these reported outcomes helped better understand process evaluation questions.

Another strength was the resources and support of the LWwD made available by the Program Director and faculty. All key stakeholders were instrumental in providing the necessary information to complete this process evaluation. Post-course evaluations, faculty interviews, published materials and class resources were all provided for the purposes of evaluation. Postal zip codes were de-identified and reported to the Primary Investigator, thus reducing a significant amount of work by the investigator.

Limitations

One of the several observed limitations in conducting this evaluation was the low number of participant post-course evaluations available for analysis. In total, there were 53 completed evaluations available for analysis out of a possible 162 registrants (33% response rate). The reasons for this may be multi-factorial. The post-course evaluation is a voluntary activity, so not

all participants may have submitted a completed form. It is also possible that evaluation forms may not have been distributed or collected as far back as 2010. Lastly, evaluation forms may have been reviewed and discarded after the results were shared with key stakeholders. Since there was not a formal evaluation being conducted before 2015, there would seemingly be little need to retain the forms once the reviews were completed.

The inability to collect robust, prospective data limited this research to a process evaluation. Typically, only two courses are offered every calendar year. The average number of registrants per course may be as few as eight individuals in a six-month period. A survey response period exceeding six months may make it difficult for respondents to remember explicit details that far back. By using the LWwD completed evaluations, the investigator received information that was collected in a significantly smaller reference period. The prospective collection of multiple course surveys would have exceeded the projected duration of this project. The collection of other prospective outcome variables such as weight loss and hemoglobin A1C would not reach statistical significance in the evaluation timeframe due to the number of enrollments, duration between course offerings, and the timetable of this evaluation.

Although the post-course evaluation was a useful tool in the evaluation process, it was not a formally validated instrument. A pre-course evaluation may have assessed the attitudes and perceptions of the participant prior to course intervention. A post-course evaluation using similar questions may then have been more sensitive in determining the effects in psychological behavior change from program participation. It is also possible there was bias in survey sampling. The number of completed post-course evaluations may not be representative of the entire program learner population. Nonresponse may indicate that some participants have have been unwilling to share their observations. It is unclear what effect nonresponse had on the total

number of completed evaluations used for analysis. Many of the previous evaluations may not have been saved after the reviews were completed. Some respondents may have also been inclined to answer a question in a manner that appears to produce a desirable response. Also, since spouses and caregivers are able to attend the class on behalf of their family member, they may have responded to questions based on their own perceptions of the program, and not of the individual that is required to make behavioral changes.

Lastly, there may have been limitations in the thematic coding process by the Primary Investigator. Since codes emerge from the data, there may have been more appropriate themes considered with multiple investigators and researchers. The Primary Investigator generated themes based on his previous academic experience in thematic analysis. This may induce a lack of reliability in the interpretation of the data. Although thematic analysis provides a flexible platform for categorization, creating a multitude of codes may make the data more difficult to interpret (Braun and Clarke, 2006).

Diabetes lifestyle wellness initiatives may also confer significant benefits in other demographics of the community. Several of these activities can be transferred into other neighborhood projects aimed to improve overall health status. The Division of Nutrition, Physical Activity, and Obesity of the Centers for Disease Control and Prevention (2011) provides a guide of strategies aimed to promote environmental change health change in various groups of people. Several cited initiatives have been outlined to adopt strategies to improve physical activity in groups that are not directly aimed to diabetes prevention and wellness. Several strategies can be implemented in communities that may lack the resources for large, community-based initiatives. However, supporting these activities would not only reduce the risk of acquiring diabetes, but may significantly reduce the onset of other chronic illnesses.

Elements of the LWwD curriculum can be divided and repurposed in other community initiatives. Health cooking classes, label reading, and physical exercise strategies can be delivered in neighborhoods that may otherwise not participate in diabetes education services.

Chapter 8: Public Health Implications

In 2010, the Agency for Healthcare Quality and Research estimated that 86% of all health care spending was for people with one or more chronic medical conditions (Gerteis et al., 2014). Despite this heightened awareness, the US health system fails to make significant gains in reducing the rates and burden of disease. Public health spending and prevention accounts for only 3.1% of the nation's healthcare associated costs. Recent data suggests that even modest reductions in unhealthy lifestyle behaviors could delay nearly 40 million cases of chronic illnesses per year (National Association of Chronic Disease Directors, n.d.). Low-cost community initiatives such as the Living Well with Diabetes program can serve to bridge the gap between the clinical arena and healthier lifestyle behaviors. In medicine, value is often defined as patient outcome relative to costs incurred to achieve the outcome. Successful healthcare systems ensure that the value proposition is always centered around the customer- the patient (Porter, 2010). Given this formula one could argue that community-based wellness and education programs could provide immense value for the healthcare system, as both the prevalence of chronic disease and its severity of illness could both be mitigated by early prevention strategies in a cost-effective environment. While the LWwD program is aimed to mitigate the symptoms of adult diabetes, the curriculum provides healthy lifestyle recommendations that would reduce other chronic conditions such as cardiovascular disease, obesity, and cancer.

The public health impact of diabetes will continue to be a growing concern for the residents of Prince William County. The population continues to grow exponentially across the region. Overall, this country is an aging society. By the year 2030, one out of every five US residents will be over 65 years of age. The prevalence of obesity and physical inactivity grow at rates that

exceed the national benchmarks. The absence of Medicaid expansion in the commonwealth prevents many low income residents from receiving routine primary care and wellness education. In Prince William County, the high costs of healthcare were determined to be the greatest public health concern among residents. In this regard, the public health sector can be perfectly positioned to meet the health needs of the community at large.

The Centers for Disease Control and Prevention (2014) identify ten essential public health services that describe the goals of public health programs. In particular, two essentials align seamlessly with the current diabetes epidemic. One essential states that people should be linked to needed personal health services and assured the provision of health care when it is otherwise unavailable. While residents may have access to emergency care, primary and preventative care services may not be attainable. Community wellness programs can help fill this void. Another essential maintains that public health services should inform, educate, and empower people about health issues. Coincidentally, the mission and vision of the Living Well with Diabetes program is to improve the health of residents and families affected by diabetes in Prince William County. The program goal is supported by applied learning skills of diabetes lifestyle management, including:

- Increased knowledge of health food choices and use of medications for families with diabetes or other chronic diseases.
- Demonstration of healthy cooking techniques.
- Promotion of physical activity as a part of diabetes control.
- Encouragement of self-management with opportunities to share and learn from one another.

The harmony between the Centers for Disease Control and Prevention and the Living Well with Diabetes program would indicate that supporting the goals of the program would improve the public health and safety of the community.

The Washington D.C. Metro region is home to over six million residents. It encompasses communities across Maryland, Virginia, and the District of Columbia, making it the seventh largest marketplace in the United States. Despite these resources, the LWwD program is the only identifiable diabetes wellness program outside of the constraints of hospital-based services. Access to services does not require a physician referral, commercial health insurance clearance, or expensive co-pays and premiums to access essential health services. The LWwD problem is uniquely positioned to be a leader in the region in diabetes prevention and management.

Chapter 9: Conclusions and Recommendations

The objective for this process evaluation was to provide key stakeholders information focused on the operations, implementation, and service delivery of the LWwD program. This information would include a community needs assessment of the public health dangers of diabetes, identifying current barriers and facilitators of the LWwD program, and learning how to best measure LWwD activities and effects. The overall aim was to examine the quantity and quality of implemented LWwD program activities developed to improve the diabetic health of vulnerable populations across the region. The data collected during this evaluation indicates an association between program participation and an individual's self-efficacy in applying healthy behavior changes. Through the incorporation of key constructs of the Social Cognitive Theory, participants of the program reported that their knowledge of diabetes management improved substantially during the course. Observational methods of instruction, such as cooking and label reading, were the highest rated aspects of the program. Respondents felt empowered to adopt changes in diet when methods of instruction were delivered with behavior modeling activities. This belief was consistent across the majority of participants. The intended delivery of the program curriculum resulted in positive changes in the knowledge, attitudes, and applied behaviors of the LWwD program participants.

One of the secondary objectives was to identify the barriers and facilitators to widespread use of the LWwD program. The most significant program barrier identified in this evaluation was the advertising and marketing activities of the program. Although program brochures are distributed at county offices and support services, word of mouth between residents was the most commonly reported method of recruitment. This would help explain the lower proportion of course participants that reside in areas of the county outside of the Manassas and Woodbridge

districts. Since nearly 50% of the participants live in these cities, the program is likely underserving vulnerable populations in the county that lack the access to marketing materials and personal contacts due to geographic constraints. This should be especially concerning in the rapidly expanding region of Western Prince William County. Bristow, Gainesville and Haymarket are among the fastest growing areas in the United States. Bristow alone has experienced a 287% increase in population since 2000 (Sperlings Best Places, n.d.). These towns combine to account for over 45,000 of the county's new residents, and potentially several thousand individuals that can greatly benefit from diabetes lifestyle education. Marketing efforts must identify strategies to penetrate into these rapidly expanding regions.

Another secondary goal was to describe the LWwD program activities and effects. The learning objectives of the LWwD Program were formulated from the success of the Dining with Diabetes Program of West Virginia. The use of these learning objectives helped communicate intent to the students as well as keeping on track with curriculum. Similar programs exist in twenty-six states and 100 counties across the country (USDA, 2012). Program educators and participants alike provided positive feedback on the delivery of course activities. The use of cognitive, psychomotor, and affective domains of learning within the program promoted active engagement of the course participants. These higher modes of learning may prove effective on the maintenance and reinforcement of newly acquired learning behaviors. Through the SurveyMonkey™ online course evaluation, the majority of respondents indicated significant improvements in their perceived ability in making healthy lifestyle changes. As a result of the program, participants felt more confident choosing healthy snacks and meals, grocery shopping, dining out, participating in physical activity, limiting stress, and adhering to their medication schedules. If these improvements in healthy behaviors can be sustained over time, there could be

significant reductions in the overall rates and burden of diabetes. Furthermore, these lifestyle modifications would help decrease the negative consequences of many other chronic diseases, such as obesity, heart and cerebrovascular disease, cancer, and arthritis.

The other secondary objectives for the evaluation were to assist in the mobilization of community support for the LWwD program and to support continued organizational development. To support these objectives, the following recommendations to the key stakeholders are aimed to identify areas of opportunity for the LWwD program to reduce the human and economic impact of diabetes.

Recommendation #1: Investigate interactive and online versions of the LWwD classroom

Internet learning can play a significantly important role in maintaining large scale behavioral change interventions. Liebreich and colleagues (2009) conducted a prospective, randomized controlled trial evaluating the feasibility of online resources for the promotion of physical activity in individuals diagnosed with type II diabetes. Intervention subjects received weekly emails, access to online logbooks and message boards, and informative articles grounded in the Social Cognitive Theory. Participants in the control group received only publication links to national clinical practice guidelines for physical activity. Using web-based resources was not only associated with higher levels of participant satisfaction, but it also demonstrated a significant improvement in the number of minutes' participants spent exercising. By developing an online community of continued diabetes education and awareness, class participants may be more inclined to remain engaged and motivated to promote lifestyle behavior changes. Class participants would be able to receive instantaneous feedback from other learners and instructors. The long-term engagement may also facilitate adherence to the newly-learned lifestyle behaviors shared during the class sessions.

Franzen-Castle and Versch (2014) implemented a web-based Learning Management system (LMS) to deliver nutritional education training to cooperative extensions across the state of Nebraska. Systems such as Blackboard and Moodle provided an interactive and asynchronous learning environment to deliver course material and instruction to class participants. LMS systems supported videos, instructional photos, and virtual discussion forums that engage the learner and promote active learning. Live video webinars through Adobe Connect allowed learners to participate in real-time class curriculum hosted by faculty instructors in offsite locations. By combining the traditional and new online learning resources, program participants are able to remain actively engaged in the program even after the sessions are complete. As the demographics of the program continue to change, the use of online resources may better meet the needs of nontraditional audiences. Another benefit of LMS systems may be the recruitment of class participants otherwise unable to commit to attending the class sessions. Given the unbalanced geographic distribution of LWwD registrants across the region, supplementing with a LMS platform may increase class enrollment of those people whose routine or location prevents consistent attendance. Furthermore, the financial constraints of the program may limit multiple classes from being hosted across eastern and western Prince William County. The LMS platform can be supplemented for individuals who would prefer electronic format.

The Ohio Office and Outreach and Engagement (Cassidy, 2013) recently launched an interactive online version of their Dining with Diabetes program. To participate online, users must have completed the face-to-face Dining with Diabetes program. The design of the online forum is to provide a virtual community that enhances follow-up and continued support. Registered users are provided access to online forums such as virtual shopping tours, quizzes, blogs, and emerging information on disease management. Program faculty may be able to keep

in contact with course graduates for long-term follow-up, but the virtual community may provide users additional social support from members across the region. LWwD participants have already responded positively to electronic uses of communication. Respondents of the SurveyMonkey™ electronic post-course evaluation rated the program's use of emails to share links of nutrition information a score of eighty-seven out of a possible score of one hundred.

Recommendation #2: Incorporate a pre-course survey for participants.

Conducting a pre-course survey (pre-test) could provide numerous benefits to the faculty and participants. Pre-testing participants provide a starting point in gauging the amount of pre-existing knowledge in diabetes. Results can be compared to the post-course evaluation to measure the impact of learning and overall effectiveness of the program. This information provided would help the faculty identify the topics that require additional instruction. Since participants may be entering into the program at different stages of the diabetes diagnosis continuum, some individuals (or classes) may require specialized attention in various areas of the curriculum. Pre-tests would indicate the learner's perceptions on behavior management and monitor these trends in lifestyle improvements across the program. The Diabetes Initiative (2009), a formal national program of the Robert Wood Johnson Foundation, has a template for a pre-participation questionnaire. While this questionnaire is much larger than what would be necessary for the LWwD program, certain data fields can be extracted for use in participants.

Recommendation #3: Increase partnerships with local businesses on program marketing

Raising the awareness of the LWwD program across communities in Prince William is paramount to meet the growing health needs of the residents. As the greatest perceived barrier to continued success of the program, marketing efforts must extend beyond the Manassas and Woodbridge locations. A more aggressive marketing campaign will expose county residents

who have otherwise been unaware of the benefits of the program. However, sustaining these efforts of recruitment must encourage collaboration with various sectors of the general public. Primary care offices throughout the community should be made aware of the program and be provided with brochures to distribute to their patients. While some primary care groups may already have referral systems in place for hospital-based diabetes education services, many others may offer this information to patients that are not yet diagnosed with diabetes, but who are at high risk. Similar referral pathways can be developed with urgent care centers, free clinics, and pharmacy services.

Renewing newspaper promotion ads should also be considered. The Bull Run Observer (2016) is the free community newspaper serving Western Prince William County. It has a circulation of over 50,000 homes, and is distributed twice a month. Fees for ads begin at $25.00. Periodic promotions in the Observer would help enter a marketplace that is underrepresented in the program. This approach can also be applied to community newsletters. Large planned subdivisions across Western Prince William typically publish community newsletters with advertising space available for purchase. They may also support community blogs and online advertising forums. Some of these subdivisions have homes numbered in the thousands. Bristow's largest planned community, Braemar, has over 2,800 residences. At even a modest fee, obtaining marketing access to this community may significantly increase program registration.

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Appendix A

Evaluation Matrix

Evaluation Goal: to conduct a process evaluation on the Living Well with Diabetes (LWwD) program. ***Evaluation Objective***: To provide key stakeholders information focused on the operations, implementation, and service delivery of the LWwD Program				
Core Concept	**Evaluation Question**	**Measure or Indicator**	**Methods**	**Data Sources**
Context	Are there contextual and environmental factors that may influence program effectiveness and delivery?	Participant behavior, faculty feedback, participant non-attendance	Retrospective document reviews of previous class calendar offerings, prospective collection of data	LWwD database activity, educator interviews
Recruitment	What methods are being used recruit bring new participants into the program?	Method of enrollment, marketing strategies, number of program participants	Retrospective document reviews of previous class calendar offerings, prospective collection of data	LWwD database activity, educator interviews
Reach	How many individuals are affected by the LWwD program?	Number of individuals that have been enrolled in the LWwD Program	Retrospective document reviews	LWwD database activity
	What are the characteristics of the participants served by the LWwD program?	Number of individuals enrolled in the LWwD program	Retrospective document reviews	LWwD database activity
Implementation: Fidelity, Exposure, and Quality	Is the LWwD Diabetes Program being delivered as intended?	Session duration, method of delivery, number of sessions, LWwD learning objectives achieved, resident accessibility	Retrospective document reviews of previous class calendar offerings, prospective collection of data	LWwD database activity, educator interviews
	What quality of intervention is being received by the LWwD participants?	Quality of delivery and resources, participant feedback	Retrospective document reviews of previous class offerings, prospective data collection	LWwD database activity, educator interviews
	How much exposure are the LWwD program participants receiving during each program activity?	Average number of sessions attended by participant, resident accessibility	Retrospective document reviews of previous class offerings, prospective collection of data	LWwD database activity
	How well are LWwD participants responding to the program?	Participation encouragement, staff levels and resources, class size, participant feedback	Retrospective document reviews of previous class offerings, prospective data collection	LWwD database activity, educator interviews
	Are there interventions delivered through the program that are more effective than others?	Educator comments, participant feedback	Retrospective document reviews of previous class calendar offerings, prospective collection of data	LWwD database activity, educator interviews
Barriers & Facilitators	What are the barriers of the LWwD Program?	Program curriculum and resources available	Retrospective document reviews of previous class offerings, prospective collection of data	LWwD database activity, educator interviews
	What are the facilitators of the LWwD Program?	Program curriculum and resources available	Retrospective document reviews of previous class offerings, prospective collection of data	LWwD database activity, educator interviews

Appendix B

Worksheet 1: Interview Template for Program Faculty

Faculty Name: _____
Date of Interview: _____
Program Evaluator: _____

	Question (Evaluation)	Answer (Faculty Member)
1	How long have you been affiliated with the LWwD Program?	
2	What is your role in the program?	
3	Prior to the LWwD Program, what is your relative experience with Diabetes?	
4	How are participants referred to the LWwD program?	
5	What do you find to be the greatest barriers to effecting change in lifestyle behaviors?	
6	How are LWwD participants are responding to the program?	
7	What are the contextual and/or environmental factors that may influence program effectiveness and delivery?	
8	How would you recommend increasing the enrollment of Prince William County residents into the program?	
9	Aside from the current educational resources offered, are there other tools and materials you believe should be available to the class?	
10	In your opinion, what are the strengths of the LWwD program?	
11	Any other items you wish to share?	

Appendix C

Worksheet 2: Living Well with Diabetes Course Evaluation

	Question (Evaluation)	Answer (Participant)
1	Was the date and time convenient for you to attend this course?	
2	What did you enjoy most about Living Well with Diabetes?	
3	Tell us something new that you learned or something that surprised you.	
4	What information gained in this course will be of most benefit to you?	
5	What do you feel you still need or want to learn about diabetes?	
6	What did you enjoy least about Living Well with Diabetes?	
7	What ideas do you have that would make this a better program?	
8	Would you recommend this Living Well with Diabetes class to other people with Diabetes?	
9	How would you rate your level of knowledge improved?	
10	How did you find out about Living Well with Diabetes course?	

Appendix D

Worksheet 3: Living Well with Diabetes Course Evaluation (1/2016)

	Question (Evaluation)	Answers
1.	During the Living Well with Diabetes class we discussed the behavior change model: precontemplation, contemplation, preparation, action and maintenance. Did you think that this concept helped you understand making behavior changes?	- Yes - No
2.	Please indicate how much you were able to improve your lifestyle behaviors as a result of Living Well with Diabetes. Numbers on the scale indicate 0 being not at all and 100 being totally. Slide the bar to show the amount of change in your behaviors.	0-100 scale - Meal and snack planning - Grocery shopping and reading food labels - Eating Out - Physical activity - Stress management - Understanding and medication instructions
3.	Living Well with Diabetes has four sessions with a follow up. Is this a good number? If not, what would be the ideal?	- 3 and a follow up - 5 and a follow up - 6 and a follow up
4.	If there were more sessions what should we add to the program?	Open text comment field
5.	How helpful are the emails with links to nutrition education - 0 being not at all, 100 being very helpful.	0-100 scale
6.	Please comment on any other aspects of the Living Well with Diabetes program. Thank you.	Open text comment field
7.	Did you lose weight as a result of attending Living Well with Diabetes?	Open text comment field
8.	Did your A1c number go down as a result of attending Living Well with Diabetes?	Open text comment field

Appendix E

Program Timeline

Month/Year	Project Goal	Related Objective	Activity	Expected Completion Date	Person responsible
8/15	Literature review	Development	Review of available published literature	10/15	Fitzgerald
10/15	Access LWwD database and activity reports	Process objective	Review all relevant materials of previous program participants	02/16	Stegon Fitzgerald
10/15	Review of Project Proposal with Committee	Development	Email/conference calls	12/15	Project Committee
01/16	IRB submission	Development	IRB submission for faculty interviews	02/16	Fitzgerald
02/16	Conduct interviews with (3) program faculty members	Process objective	1:1 interviews with program faculty on the overall delivery of the LWwD program	02/16	Fitzgerald
02/16	Data Analysis and Report Writing	Analysis	Analyze collected data, summarize, and make recommendations	03/16	Fitzgerald
03/16	Submit formal process and outcome evaluation	All objectives	Finalize evaluation and submit to Project Committee	03/16	Fitzgerald Practicum Committee

Appendix F

UAA Investigational Review Board Approval

Research & Graduate Studies
University of Alaska Anchorage

3211 Providence Drive
Anchorage, Alaska 99508-4614
T 907.786.1099, F 907.786.1791
www.uaa.alaska.edu/research/ric

DATE:	March 16, 2016
TO:	David Fitzgerald, BS
FROM:	University of Alaska Anchorage IRB
PROJECT TITLE:	[848324-3] Student Program Evaluation of the Living Well with Diabetes (LWwD) Program of Prince William County, VA
SUBMISSION TYPE:	Revision
ACTION:	APPROVED
DECISION DATE:	March 16, 2016
EXPIRATION DATE:	March 15, 2017
REVIEW TYPE:	Expedited Review

Your proposal received an expedited review and was granted approval with minor revisions. Thank you for a copy of these revisions. Therefore, in keeping with the usual policies and procedures of the UAA Institutional Review Board, your proposal is judged as fully satisfying the U.S. Department of Health and Human Services requirements for the protection of human research subjects (45 CFR 46 as amended/ revised). This constitutes approval for you to conduct the study.

This approval is in effect for one year. If the study extends beyond the expiration date of this letter, you are required to submit a progress report and to request continuing approval of your project from the Board. At the conclusion of your research, submit the required final report to the IRB. These report forms are available on IRBNet.

Please report promptly proposed changes in the research protocol for IRB review and approval. Also, report to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

On behalf of the Board, I wish to extend my best wishes for success in accomplishing your objectives

Ronald S. Everett, Ph.D.

Chair, Institutional Review Board

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