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Report

Evaluation of the Downeast Community Health Regional Partnership Type II Diabetes Prevention and Management Program – Final Report

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EXECUTIVE SUMMARY

The Downeast Community Health Regional Partnership (DCHRP), a consortium consisting of community organizations, primary care providers, hospitals, an academic institution, and local residents, was formed to reduce the prevalence and improve the management of care for people diagnosed with chronic health conditions in Hancock County, Maine. The aims of the Diabetes Prevention Project (DPP) undertaken by the DCHRP were to decrease the prevalence of type II diabetes in Hancock County through: (1) proactive detection of risk factors for developing type II diabetes; (2) implementation of the National Diabetes Prevention Program (NDPP) using trained volunteer or paid community health workers (CHWs); and (3) improved access to diabetes self-management training (DSMT) for the uninsured or underinsured diagnosed with type II diabetes. Funding for the project came largely from a US Rural Health Care Services Outreach grant awarded to Mount Desert Island (MDI) Hospital, a 25-bed Critical Access Hospital and operator of six primary care centers serving Hancock County.

The evaluation of the DCHRP Diabetes Prevention Project, conducted by the University of New England School of Community and Population Health, used qualitative and quantitative information obtained on program implementation, participants, and staff. Participant data included biometric data (BMI, FBS, and A1C levels at baseline, 6 months, and 12 months), and qualitative information collected before and after the NDPP on participant health goals and family/community support for lifestyle changes. Information was also obtained from all participants at each attended NDPP session, including weight and minutes of physical activity per week. Evaluation of the DSMT relied on information gathered from the electronic health records of patients diagnosed with diabetes at participating health centers.

Some highlights of the evaluation were:

- *Screening*: 312 Hancock County adults were screened for prediabetes. Of those screened, 72 were identified using national guidelines as prediabetic and an additional 117 were considered high-risk for developing type II diabetes.
- *Diabetes Prevention*: 11 NDPP groups were formed over the 3-year period, with 99 of the 132 eligible at-risk patients completing at least 9 of the 16 NDPP core sessions. (Note: One group has not yet completed the entire program.) Among those who have completed the program, participants experienced an average weight loss of 7.1% of their body weight. Using paired t-tests, mean changes in BMI at 6 and 12 months have been significant ($p<0.001$).
- *Diabetes Self-Management:* 43 uninsured/underinsured patients with diagnosed type II diabetes participated in DSMT programming. 61% of these patients improved their A1C levels from baseline to follow-up.

BACKGROUND AND PURPOSE

The prevalence of type II diabetes, and its associated risk factors, is high in Maine and the U.S. In Hancock County, Maine, the prevalence is 7.8%, which is similar to the state (8.7%). Risk factors for developing type II diabetes are especially high in Hancock County where 27% of the population is obese and 24% report no leisure time physical activity.[1] Most cases of type II diabetes can be prevented by living a healthy lifestyle – maintaining a normal weight range, getting regular physical activity, eating a healthy diet, and reducing stress. Effective prevention interventions for those at risk of developing type II diabetes have been shown to be effective at reducing prevalence. Assisting those who already have type II diabetes to control their symptoms through training and education has also been shown to work.

The Downeast Community Health Regional Partnership (DCHRP) was established in 2012 through funding from a U.S. Health Resources and Services Administration's (HRSA) Rural Health Care Services Outreach Grant awarded to Mount Desert Island (MDI) Hospital. A primary aim of the grant was to develop a comprehensive and sustainable continuum of care for diabetes that addressed prevention, detection and treatment, and collaboratively involved community resources and organizations, primary health care providers, and area hospitals. This initial project sought to decrease the onset and improve control of diabetes with a sustainable, integrated approach to diabetes prevention and management

Purpose of the Evaluation: The DCHRP Diabetes Prevention Project evaluation conducted by the University of New England (UNE) School of Community and Population Health was designed to provide the project leadership team with information on the implementation and results of the interventions undertaken on both diabetes prevention and management. The evaluation consisted of a **process evaluation** that assessed DCHRP accomplishments, participation, program differences, and barriers to project implementation; and an **outcomes evaluation** that measured participant health outcomes over the course of the program. The process evaluation had two primary objectives: (1) provide information to project sponsors, funding agencies, and supporting partners on the accomplishments and barriers of the project in meeting the objectives and tasks outlined in the work plan; and (2) provide DCHRP leadership with continuous feedback on the project based on the data received. The objectives of the outcomes evaluation were also twofold: (1) assess the effectiveness and impact of the community-based diabetes prevention efforts on participant risk for diabetes; and (2) determine if increased diabetes management efforts improved diabetes control.

DESCRIPTION AND APPROACH – DIABETES PREVENTION

Diabetes Prevention Activities: The Center for Disease Control and Prevention (CDC) National Diabetes Prevention Program (NDPP) is a lifestyle change curriculum aimed at preventing the onset of type II diabetes.[2] The NDPP curriculum has two components: (1) 16 core sessions that focus on assisting participants with the adoption of incremental lifestyle changes for healthy eating and physical activity. Each session is designed to help participants develop and maintain skills and knowledge needed for healthy living. Groups generally meet with their lifestyle coach for approximately an hour each week. (2)

[1] The Maine State Health Assessment, 2012. Maine Centers for Disease Control & Prevention. 2013. Available at: http://www.maine.gov/dhhs/mecdc/phdata/sha/index.shtml

[2] Diabetes Prevention Program Research Group. Knowler WC, Barrett-Connor E, et al. Reduction in the incidence of type II diabetes with lifestyle intervention or metformin. N Engl J Med. 2002; 346(6): 393–403.

At least 6 post-core sessions that participants attend for one hour each month following completion of the core phase. The post-core sessions are meant to provide additional support, reinforce the lessons from the core phase, and help participants independently maintain their healthy lifestyles.[3]

11 NDPP groups were established by the DCHRP throughout Hancock County and a total of 11 volunteer or paid (i.e. employees of MDI Hospital or partnering organizations) community health workers (CHWs) facilitated the delivery of the NDPP curriculum to these groups. (See Table 1, below.) The groups consisted of between 8 to 17 people. About half of whom were diagnosed with prediabetes, while the other half met biometric guidelines for prediabetes but had not been diagnosed.

The CHW model used by the DCHRP was based on the Delta Community Health Worker Program of rural southern Mississippi. The Delta CHW Program utilizes paid (full and part-time) and local volunteer CHWs as members of the patient care team, to promote self-management of chronic health conditions. The Delta CHW Program relies on locally known mediators to help build relationships with patients, to change their risk behaviors and improve their health outcomes. Pairing a clinician with a local CHW is key to the model for improving patient knowledge to self-manage their condition. The DCHRP adopted the model as the implementation framework for rolling out the NDPP.

Evaluation Methods – Diabetes Prevention: Evaluation of the NDPP implementation relied upon a pre-post quasi-experimental design, using site-specific information on participants and facilitators. Data was obtained on the location of sessions, facilitators (volunteer or paid CHWs), recruitment efforts, number of sessions completed, participants' primary health care providers, and follow-up efforts. Participant data on outcomes included biometric data pre, six months, and one year following the start of the group sessions. Session data was also obtained for each participant attending.

Selection Procedures and Description of Respondents – Diabetes Prevention: All potential participants in the NDPP were either screened in-person or had their eligibility determined through the hospital's medical records. Eligibility for participation in the program was determined based on NDPP standards. To be eligible for the program, patients had to:

- Be at least 18 years old, **and**
- Be overweight (body mass index (BMI) ≥24; ≥22 if Asian) **and**
- Have a blood test result in the prediabetic range within the past year:
  - Hemoglobin A1C: 5.7 - 6.4% **or**
  - Fasting plasma glucose: 100 - 125 mg/dL **or**
  - Two-hour plasma glucose (after a 75gm glucose load): 140 - 199 mg/dL **or**
- Be previously diagnosed with gestational diabetes **and**
- Have no previous diagnosis of diabetes[4]

Each participant was also given a risk score for prediabetes using the CDC self-screening test (irrespective of lab results) and based solely on BMI scores, age, family history, and history with gestational diabetes.

[3] Centers for Disease Control & Prevention. National Diabetes Prevention Program. April 2015. Available at: http://www.cdc.gov/diabetes/prevention/index.htm

[4] Centers for Disease Control & Prevention. National Diabetes Prevention Program. April 2015. Available at: http://www.cdc.gov/diabetes/prevention/index.htm

Two sites were selected to start implementation of the NDPP in Hancock County – Swan's Island and the Jackson Laboratory, the largest employer on Mount Desert Island. Approximately 900 people were initially screened at Swan's Island, an island off the coast, and at the Jackson Laboratory. Risk was determined through a blood test and/or history with gestational diabetes. From this cohort of identified patients at risk for diabetes, 17 participants were enrolled in the first NDPP group on Swan's Island. A group was started at the Jackson Laboratory, but due to lack of interest by participants it was disbanded.

Additionally, in May 2014, MDI Hospital conducted a screening at their Community Health Center in Southwest Harbor. Data on all Center patients 18 years of age and older were reviewed for diabetes risk based on lab results (A1C, fasting plasma glucose), known risk factors (weight, age), and medical history (history of gestational diabetes, family history of diabetes). This resulted in 77 patients identified as prediabetic and an additional 117 as at high-risk for developing type II diabetes, out of the 962 adult patients (age 18 years of age or older) serviced at the Southwest Harbor Community Health Center. These individuals were contacted and provided information on the upcoming NDPP groups they could attend located in proximity to their residence.

Data Sources – Diabetes Prevention: Both qualitative and quantitative data was collected from participants before, during, and after participation in the NDPP groups. This included:

- Intake/exit interview forms that the NDPP groups filled out before and after the 16 NDPP core sessions, which included relevant health information (e.g. smoking/alcohol use, previous diagnosis of gestational diabetes, high blood pressure, etc.), insurance status, and primary health care provider information, as well as personal health goals, available support for lifestyle changes, and readiness to commit to lifestyle changes.
- NDPP data collected at each session/post-core session and submitted to the CDC in order to maintain NDPP recognition. In addition to demographic information (age, gender, ethnicity/race), information on participant weight, type of test used to diagnose prediabetes, and self-reported minutes of physical activity per week were collected.
- Biometric data (A1C, body mass index (BMI), fasting blood glucose, and low-density lipoprotein (LDL) cholesterol) collected from MDI Hospital's electronic medical records at baseline, 6 months, and 12 months.

Data Process and Analysis Technique – Diabetes Prevention: Quantitative data was analyzed primarily through descriptive statistics, with paired sample t-tests used to statistically assess differences in mean biometric measures over time. Due to a preponderance of missing data (see the Data and Study Limitations section, below) at 6 months and 12 months, evaluators assessed differences in means using a cohort of participants who had biometric readings at baseline, 6 months, **and** 12 months. Evaluators also tested significance comparing baseline and 6 months results **only**, and baseline and 12 months results **only**, for each biometric measure. The former approach allowed for the consideration of changes in biometric measures at three time periods, although it limited the sample size; the latter approach provided larger sample sizes, but was limited in the number of considered time periods.

For qualitative data collected before and after participation in the NDPP groups, responses were examined and coded based on similar themes, and then analyzed for trends and differences between before and after participation in the NDPP groups.

Data and Study Limitations – Diabetes Prevention: There are several data limitations that must be noted:

- Most participants had significant gaps in collected data, particularly biometric data at 6 months and 12 months. This information was collected during routine primary health care provider appointments and/or lab testing, thus patients who missed appointments did not have their information collected. For example, some patients only had lab results (i.e. A1C, lipid levels, and/or fasting blood plasma results) but did not have their blood pressure or weight recorded because they did not have a provider visit. Many patients were also missing data because they were "snowbirds" – that is, they reside in Maine only during the warmer months and head south during the winter. Many such individuals were not able to provide data at 6 months or 12 months.
- A large number of participants were unable to have their blood pressure measured at 6 months and 12 months. Analysis of changes in blood pressure was therefore excluded from the analysis.
- Many participants also missed qualitative data collected at the end of the NDPP groups. In part, because some group facilitators neglected to distribute the exit interview form.
- Because biometric information was collected during routine provider appointments, not all patients were able to provide data at exactly 6 and 12 months.

RESULTS – DIABETES PREVENTION

Impact and Outcomes: 11 NDPP groups were formed over the 3-year period with 108 of the 132 eligible at-risk patients completing at least 9 of the 16 NDPP core sessions, and 61 completing at least 3 of the post-core sessions. It should be noted that the completion numbers do not include a group from Deer Isle, Maine, who had not completed the entire NDPP curriculum as of the time of the evaluation. (See Table 1, below.) 106 of the 132 participants provided demographic and socioeconomic background information at baseline:

- Insurance Status: Most participants (n=50) had private insurance, followed by Medicare (n=34). 4 participants were covered by MaineCare (Maine's Medicaid program) and 5 participants were uninsured. 12 participants did not answer the question.
- Gender: Most participants (n=71) were female. The remaining 35 participants were male.
- Race/Ethnicity: All participants (n=106) were white.
- Age: Most participants (n=47) were 65 years of age or older. 46 participants were between the ages of 45 and 64 and the remaining participants (n=10) were 44 years of age or younger.
- Primary Care: Most participants' primary health care providers were part of the MDI Hospital care system (n=83). 19 participants obtained primary care from providers employed by the Maine Coast Memorial Hospital (n=10) or the Blue Hill Memorial Hospital (n=9), the other two hospitals serving the Hancock County area. Both hospitals are members of the DCHRP.

In addition, these 106 participants also provided background health information:

- Smoking History: Most participants (n=66) had never smoked. 31 participants were former smokers and 8 participants were current smokers.
- Alcohol: Most participants did not regularly consume alcohol (n=36) or rarely consumed alcohol (n=30). 24 participants said they were occasional drinkers and 13 participants said they were moderate drinkers.
- Gestational Diabetes: Only 4 participants had been diagnosed with gestational diabetes in their lifetime.

- High Blood Pressure: Most participants (n=63) had been diagnosed with high blood pressure. The remaining 43 participants had not been.
- Elevated Blood Sugar: Approximately half of all participants (n=50) had been told by their provider that they had elevated blood sugar. Of the remaining 56 participants, 50 had not been told that they had elevated blood sugar and 6 did not answer the question.
- Prediabetes Diagnosis: 56 participants had not been told by their provider that they were prediabetic. 49 participants had been told that they were prediabetic and 4 participants did not answer the question.
- Metformin: Although 49 participants had been told by their provider that they were prediabetic (and all participants were at-risk for diabetes), only 4 participants were taking metformin therapy. Metformin has been demonstrated to prevent the onset of type II diabetes in adults for at least 5 years[5] and potentially as long as 10 years.[6]

Biometric Outcomes: The following changes in mean biometric measures were observed, using pair-sample t-tests:

- Weight/BMI: 34 participants had their weight and BMI measured at baseline, 6 months, and 12 months. Of this group, the mean BMI was 34.6 at baseline, 31.6 at 6 months, and 32.3 at 12 months. Differences in mean weight loss were significant at both 6 months ($p<0.001$) and 12 months ($p<0.001$) among this group. Total weight loss over the course of each NDPP group was also considered. Among those who had completed their participation in the core and post-core phases of the program (n=46), the average weight loss was 7.1% of body weight.
- A1C: 25 participants had their A1C levels measured at baseline, 6 months, and 12 months. Of this group, mean A1C was 5.6% at baseline, 5.6% at 6 months, and 5.6% at 12 months.
- Fasting Blood Glucose: 26 participants had their fasting blood glucose levels measured at baseline, 6 months, and 12 months. Of this group, mean fasting blood glucose was 106.9 mg/dL at baseline, 101.8 mg/dL at 6 months, and 102.42 mg/dL at 12 months. Differences in mean fasting blood sugar were significant at 6 months ($p=0.019$), but not at 12 months ($p=0.141$).
- LDL Cholesterol: 26 participants had their LDL cholesterol levels measured at baseline, 6 months, and 12 months. Of this group, mean LDL was 115.3 mg/dL at baseline, 107.4 mg/dL at 6 months, and 113.8 mg/dL at 12 months. Differences between baseline and 6 months were significant ($p=0.05$), but not at 12 months ($p=0.70$).

There are several takeaways from these findings:

- Weight loss was considerable among participants, as evidenced by the significant differences in average BMI, although there was a slight increase in average weight between 6 months and 12 months.
- There was no difference in A1C levels among those who had A1C measured at baseline, 6 months, and 12 months. However, when evaluators compared mean A1C levels between baseline and 6 months, among those who had A1C measured at only these time periods (see Data Process and Analysis Technique section, above), A1C levels were significantly lower (n=58; $p=0.002$), 5.7% at baseline and 5.6% at 6 months. When evaluators compared patients with mean A1C measured at baseline and 12 months only, they were not significantly different (n=39; $p=0.854$).

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[5] Salpeter SR, Buckley NS, Kahn JA, et al. Meta-analysis: metformin treatment in persons at risk for diabetes mellitus. *Am J Med.* 2008;121:149-157

[6] Knowler WC, Fowler SE, Hamman RF, et al. 10-year follow- up of diabetes incidence and weight loss in the diabetes prevention program outcomes study. *Lancet.* 2009;374: 1677-1686.

- Among those who had fasting blood glucose levels measured at baseline, 6 months, and 12 months, fasting blood glucose levels were higher at 12 months than at 6 months; despite significantly lower mean levels between baseline and 6 months. As with the other biometric measures, evaluators analyzed fasting blood glucose for patients measured at baseline and 6 months only, and again at baseline and 12 months only. Results were similar, despite increases in sample size. Again, differences in mean fasting blood glucose levels were significant at 6 months ($n=55$; $p<0.001$), but not at 12 months ($n=42$; $p=0.969$).
- Among those with LDL cholesterol levels measured at baseline, 6 months, and 12 months, differences between LDL cholesterol at baseline and 6 months were significantly lower, but not at 12 months. Comparing participants with LDL cholesterol measured at baseline and 6 months only, and baseline and 12 months only, produced slightly different results. 56 patients had LDL cholesterol measured at baseline and 6 months only, and the mean differences were not significant ($p=0.128$). 40 patients had LDL cholesterol measured at baseline and 12 months only. Mean differences were not significant ($p=0.260$). An increase in LDL cholesterol was observed between baseline (107.45 mg/dL) and 12 months (113.55 mg/dL).
- Overall results suggest that patients were very successful at improving their health at 6 months, but regressed to some extent at 12 months. As newer participants report their 6 and 12 month results, evaluators plan to re-examine these initial findings.

Qualitative Data at Pre- and Post-Participation in NDPP:
Goals: At the start of the program, participants were asked what their goals were for the program. Of the 99 participants that responded, most stated that they would like to lose weight (n=67). Many also stated that they wanted to prevent diabetes (n=36). Other common goals were "eat healthy" and "become more physically active".

At the end of the program, participants were asked if they felt they had accomplished the goals they set out for themselves at the beginning of the program. All respondents responded "yes" or "somewhat" (n=44). Participants were also asked what their goals were going forward. Again, most said that they would like to continue to lose weight (n=26) and/or to continue to prevent diabetes (n=16). Responses also included variations of "eat healthier" and "exercise more", and some expressed a goal to learn more about how they can improve their health.

Barriers: Prior to participation in the NDPP groups, participants were asked about perceived barriers to their future success. There was considerable variation in the responses of the 84 participants that completed this question. A sizeable number responded that maintaining a healthy diet was a barrier (n=34), stating that, for example, they "like sweets too much" or they need "quick food" given their schedule. Other identified barriers were injuries that prevent regular physical activity, lack of time to commit to a healthy lifestyle (e.g. "I don't have set breaks and work six days a week"), and the winter weather.

At the end of the program, participants were asked again about perceived barriers to continuing their healthier lifestyles. Responses again ranged considerably, with some similar responses (e.g. weather, injuries), although many specifically referred to maintaining the lessons they learned over the course of the program. For example, many people were worried about being able to continue to track their calories (e.g. "slipping on my calorie counting", "planning ahead of time for the week") or regressing on healthier eating and exercise habits (e.g. "need to conquer bad ideas").

Support: At the start of the program, participants were asked to identify the person(s) they could rely on to support them in their healthier lifestyles during the program. 88 people responded. Most said friends and/or family (n=72), with some people saying themselves. Other responses include the NDPP groups, or their doctor.

At the end of the program, participants were asked to identify the person(s) they were going to rely on for continued support of their healthier lifestyles. 39 participants responded. While the most common responses were still friends and/or family (n=27), a number of participants (n=14) said the NDPP group and/or the facilitator would serve as their support system – more so than was indicated at the start of the program. This was especially true among the participants of the first Swan's Island group.

Changes in Behavior: At the end of the program, participants were asked what changes they made in their diets over the course of the program, with 44 participants responding. The most common responses (n=26) concerned reading labels ("paying attention to my intake") and/or keeping track of what they ate daily (e.g. "read labels and watch calories", "consistent recording right amount of fat grams"). Other common responses were about eating smaller portions, trying to eat more fresh produce and less fatty/sugary foods, and self-motivating to make better food choices (e.g. "saying no to myself more often").

Participants were also asked what changes they made to exercise more over the course of the program, with 44 participants responding. Many responses (n=29) stated that they were walking regularly (e.g. "I walk nearly every day. Sometimes hike park trails"). Others cited the motivational approaches they had adopted in order to exercise regularly, such as writing down their progress (e.g. "write down everything and keep track") or forcing themselves to exercise (e.g. "move instead of thinking of moving").

Replicability in Other Communities: There are several components of this program – screening, diabetes prevention programming, using local volunteer CHWs to deliver the curriculum – that can be replicated in other rural communities. The NDPP is a well-established, evidence-based program whose efficacy in rural communities has not been as thoroughly researched as it has in urban areas.[7] Based on the experiences of the DCHRP, short-term improvements in health outcomes for rural communities are possible, if not expected.

Moreover, at least in Maine, there has been some movement to start reimbursing providers for running these programs. For example, in the near future, State of Maine employees will start having their participation in NDPP reimbursed through their health insurance, as long as their participation in the NDPP is through organizations with (federal) CDC-approved Pending/Full Recognition,[8] which includes MDI Hospital. Should this be expanded to other public/private payers in Maine and elsewhere, rural communities can expect greater support to replicate programs like those implemented by the DCHRP.

Finally, the screening process undertaken at the Southwest Harbor Community Health Center to identify eligible patients with prediabetes through their electronic medical records proved successful; however, it was also very time-consuming. To the extent that other rural community health care providers have an electronic medical record system that can easily be queried, the easier it will be to replicate this process of

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[7] Mohammed K. Ali, Justin B. Echouffo-Tcheugui and David F. Williamson. How Effective Were Lifestyle Interventions In Real-World Settings That Were Modeled On The Diabetes Prevention Program? *Health Affairs,* 31, no.1 (2012):67-75

[8] Maine CDC. "WellStar ME & National Diabetes Prevention Program Reimbursement Presentation". May 2015.

identifying eligible participants. However, this does not eliminate the process of marketing to eligible patients via telephone or some other mechanism, which is also very time-consuming.

Key Lessons Learned: Several key lessons were learned regarding the diabetes prevention efforts of the DCHRP:

- There appeared to be at least some benefit in utilizing and maintaining a network of volunteer CHWs to help lead and participate in the functioning of the NDPP groups. Anecdotally, participants expressed appreciation for having a non-clinical, local presence in the groups, especially the Swans Island groups, in that it helped them to trust and participate in the groups. However, no evidence was found that the presence of a volunteer CHW had an impact on participant behavior change or health outcomes.
- It should be noted that significant time and resources were devoted to recruiting and maintaining the network of volunteer CHWs. Each time a new NDPP group was formed, DCHRP staff had to find someone to help run the group, and if needed, have them trained to deliver the NDPP curriculum. In addition, of the volunteer CHWs that have helped facilitate the NDPP groups, almost all are no longer available for this work.
- The NDPP curriculum itself was very well-regarded by participants, despite the significant time commitment, as reflected in feedback provided by participants at the end of the program, as well as the generally high attendance during the core phase.
- The DCHRP and MDI Hospital were very successful at getting participants to attend the 16 core sessions, as evidenced by the high attendance rate. However, more effort is needed to retain participants during the post-core phase, as attendance dropped off considerably during these monthly sessions. The post-core phase is meant to reinforce the healthy habits learned during the core phase and as such, is critical to help ensure participants maintain healthy lifestyles.

Strategies Implemented Contributing to Project's Success – Diabetes Prevention: As stated above, there were several strategies adopted that contributed to the success of the DCHRP:

- The use of groups to deliver the NDPP curriculum seemed to appeal to participants, as it created a support system for many. A number of the groups also happened to consist of married couples and/or family members, which strengthened the available supports to maintain lifestyle changes for these particular participants.
- The Delta CHW program was a useful model for the framework of the NDPP groups, as the CHWs seemed to help the NDPP groups function. However, there were also definite logistical drawbacks (e.g. sustaining the volunteer CHW network).
- It's clear that the partnerships fostered by MDI Hospital and the DCHRP helped the groups to function effectively. Partnering with the local YMCA in Ellsworth, for example, provided a setting for three NDPP groups, which were also facilitated by YMCA employees.
- Swan's Island seemed to provide an ideal location to pilot the NDPP groups. Diabetes and prediabetes prevalence rates, and associated risk factors, were known to be high in the community. It is a small, remote, close-knit community that benefited from the strong leadership of the island health center staff but lacked resources to maintain healthy lifestyles, such as regular fresh produce. Having this first NDPP group find success at reducing risk factors for diabetes provided some initial local publicity for the DCHRP, as well as momentum for subsequent NDPP groups.

DESCRIPTION AND APPROACH – DIABETES SELF-MANAGEMENT

MDI Hospital's diabetes self-management training (DSMT) program adheres to the American Diabetes Association (ADA) self-management and education standards, and is a recognized ADA Education Program. During the grant phase, Diabetes Educators at MDI Hospital engaged diabetic patients who were either uninsured or underinsured (i.e. had a very high deductible (>$10,000)), and were otherwise unable to participate in DSMT activities.

In addition, a cohort of patients with diabetes was identified as residing on Mount Desert Island and not physically able to attend DSMT at any site. In collaboration with the Mount Desert Nursing Association (MDNA), basic DSM education was provided. Referrals were sent to MDNA from MDI Hospital staff. MDNA then deployed per diem RN staff to meet with qualifying patients on the island and communicated the patient care plan and progress back to the referring staff.

Evaluation Methods – Diabetes Management: Evaluation of the DCHRP's diabetes self-management training efforts focused on measuring changes in A1C levels among participants with diagnosed type II diabetes before and after participation in DSMT, as well as the frequency of eye and foot exams.

Selection Procedures and Description of Respondents – Diabetes Management: Diabetes self-management training efforts focused on reaching out to patients of MDI Hospital's Southwest Harbor Community Health Center who were diagnosed with diabetes and were uninsured or underinsured, and would otherwise be unable to participate in MDI Hospital's DSMT program. Care managers from MDI Hospital contacted these patients and: (1) encouraged them to have their A1C levels measured at least twice a year, (2) assisted them in overcoming any barriers to needed care (i.e. arranging for transportation to appointments, referring patients to available community resources, etc.), and (3) offered diabetes self-management education and training opportunities for those who hadn't received it. Care managers also reached out to patients individually to ensure compliance, as well as to arrange transportation, if needed.

Data Sources – Diabetes Management: All patient data was pulled directly from MDI Hospital's electronic medical records, as well as from data maintained as part of the ADA DSM Recognition Program.

Data Process and Analysis Technique – Diabetes Management: Due to the limited availability of data (see Data and Study Limitations section, below), the evaluators relied on descriptive statistics to analyze the data, including changes in A1C levels before and after participation in the program.

Data and Study Limitations – Diabetes Management: The DSMT program had been operating at MDI Hospital for several years before the DCHRP and a system was already in place for collecting data from individuals who participated in the program. With Outreach funding additional uninsured patients with diabetes were able to take advantage of the program. However the data collected did not distinguish between the two populations so evaluators were unable to compare program results.

RESULTS – DIABETES SELF-MANAGEMENT

Impact and Outcomes: 43 patients were selected and participated in DSMT. 57% of them were up-to-date with their foot exams, 24% were up-to-date with their eye exams, and 19% were up-to-date with both. Additionally, 61% of patients experienced a reduction in their A1C levels from baseline to follow-up, while an additional 8% kept their A1C levels the same.

Replicability in Other Communities: Like the NDPP, the ADA diabetes self-management training program is a well-established tool for patients with diabetes to assist them in managing their condition.[9] Unlike the NDPP, it is a program that payers reimburse services for. While it may be difficult for other rural communities to offer the DSMT program to the same subset of diabetic patients, i.e. the uninsured/underinsured, the DSMT program itself is an effective tool for rural providers to use with their patients.

Key Lessons Learned: In discussions with the DCHRP members and the care managers who have been working with these patients, it is clear that utilizing Outreach resources to improve access to DSMT has resulted in many participants improving their health status, although more data is needed to confirm this conclusion. However, of the three key components of this project – screening, diabetes prevention, and diabetes management – it is apparent that this component (diabetes management) will be the most difficult to sustain once Outreach funding ends, because it will be difficult to pay for. In addition, it is clear that this group of patients has some difficulty remaining up-to-date with their eye/foot exams, which is understandable given the many barriers, including cost, associated with having the exams completed regularly.

Strategies Implemented Contributing to Project's Success: Two strategies in particular were effective at ensuring success with DSMT: (1) In discussions with the MDI Hospital care managers, it is apparent that DSMT provided support to patients who needed significant help managing their health issues. All selected patients were low-income and struggling to maintain their health. Targeting this subset of patients resulted in improvements in their health status, despite the presence of many barriers. (2) The partnership with MDNA showed some promise in reaching patients with very significant health issues, who would not have otherwise been reached by the local health system.

While it remains to be seen whether these patients will be able to continue to manage their condition, the results suggest that DSMT has at least resulted in short-term positive impacts in health status among these patients.

DISSEMINATION OF PROJECT FINDINGS

The DCHRP will disseminate this final report to all internal and external partners. It will also be made publicly available on the University of New England's (UNE) website, on MDI Hospital's website, and on the websites of all participating members of the DCHRP that consent. The DCHRP and the evaluation team have disseminated information about the project through a number of publications and venues:

- The UNE evaluation team and the DCHRP leadership had an oral presentation abstract accepted to the American Public Health Association's (APHA) 2015 Annual Meeting. The focus of the presentation will be on the implementation of the NDPP in rural settings, the use of volunteer/paid CHWs to deliver the NDPP curriculum, as well as associated risks and challenges of using CHWs.
- The evaluation team and DCHRP also had an abstract accepted for presentation at the Maine Public Health Association's (MPHA) 2015 Annual Conference.
- In addition, the evaluation team has drafted a manuscript for publication that details these results.

[9] Norris SL, Engelgau MM, Narayan KV. Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care*. 2001;24(3):561-587

The DCHRP has also disseminated information about the project through local media[10,11] and publicly available online media.[12]

CONCLUSIONS AND RECOMMENDATIONS

As discussed above, this project had demonstrable, positive impacts on the health and well-being of Hancock County residents with symptoms of prediabetes or diabetes. While both components of the project were beneficial, the diabetes prevention groups are more likely to be sustained once funding ends. Expanding access to DSMT for the uninsured/underinsured does not have enough financial support to fully continue. Likewise, continuing to screen patient medical records for type II diabetes risk factors would require considerable effort from clinical staff. It is anticipated that, as awareness of the NDPP groups in Hancock County grows, area primary health care providers will begin to refer their at-risk patients to the NDPP groups.

In addition, the DCHRP will continue to function and meet regularly. Healthy Acadia, a public health service organization and a Healthy Maine Partnership serving the Downeast region, has been awarded funding from the most recent round of Rural Health Care Services Outreach grants. This funding will be used to continue and expand the prevention and self-management efforts of the DCHRP. It will: (1) fund several individuals to become Diabetes Training and Technical Assistance Center (DTTAC) Master Trainers, which will allow clinical staff and volunteer CHWs to receive the two-day Lifestyle Coach Training at a local setting in Hancock County; (2) fund several individuals to become certified to offer training in the Stanford Chronic Disease Self-Management and Stanford Chronic Pain Self Management programs (two evidence-based, self-management programs, that like the NDPP are typically delivered in group sessions.); (3) expand NDPP groups (as well as the Stanford Chronic Disease/Chronic Pain Self-Management programs) to neighboring Washington County (a county with very high prevalence rates of chronic disease and associated risk factors); and (4) by incorporating these self-management and prevention activities into the regular public health offerings of Healthy Acadia, increase the likelihood of sustaining these programs post-funding.

[10] http://www.workingwaterfrontarchives.org/2014/05/20/big-losers-diabetes-prevention-becomes-way-of-life-for-islanders/
[11] http://bangordailynews.com/community/deer-isle-diabetes-prevention-program-paying-off/
[12] https://vimeo.com/69193213

Table 1: NDPP Group Descriptions

Name of Site	Start/End Date (Core & Post-Core)	Name of NDPP Lead Facilitator & Assistant	No. to Start Program	No. to Complete NDPP Core*	No. to Complete NDPP Post-Core**
Swan's Island (Group 1)	*Core*: 1/29/2013 – 5/14/2013 *Post-Core*: 6/18/2013 – 11/12/2013	*Facilitator:* Elise O'Neil, RN *Assistant:* Donna Wiegle	17	12	10
Swan's Island (Group 2)	*Core*: 1/14/2014 – 4/29/2014 *Post-Core*: 5/28/2014 – 11/7/2014	*Facilitator:* Elise O'Neil, RN *Assistant:* Donna Wiegle	10	8	6
Southwest Harbor (CHC*** - Group 1)	*Core*: 7/9/2013 – 10/29/2013 *Post-Core*: 11/7/2013 – 5/27/2014	*Facilitator:* Elise O'Neil, RN *Assistant:* Melanie Strout	13	11	7
Southwest Harbor (CHC - Group 2)	*Core*: 7/1/2013 – 10/24/2013 *Post-Core*: 12/5/2013 – 5/27/2014	*Facilitator:* Elise O'Neil, RN *Assistant:* Melanie Strout	8	6	3
Southwest Harbor (CHC - Group 4)	*Core*: 6/12/2014 – 9/25/2014 *Post-Core*: 10/23/2015 – 4/9/2015	*Facilitator:* Kelly Corson, HC *Assistant:* Elise O'Neil, RN	17	12	7
Southwest Harbor (Strauss Center)	*Core*: 11/12/2013 – 3/25/2014 *Post-Core*: 5/1/2014 – 11/20/2014	*Facilitator:* Elise O'Neil, RN *Assistant:* Melanie Strout	17	14	8
Trenton	*Core*: 2/11/2014 – 6/3/2014 *Post-Core*:7/29/2014 – 9/30/2014	*Facilitator:* Lynn Assaf *Assistant*: Amanda Klug	8	7	1
Bar Harbor (Group 1)	*Core*: 10/2/2013 – 1/29/2014 *Post-Core*: 2/26/2014 – 8/27/2014	*Facilitator:* Lynn Assaf *Assistant:* Doreen Willett	10	10	4
Bar Harbor (Group 2)	*Core*: 6/3/2014 – 9/16/2014 *Post-Core*: 10/14/2014 – 4/21/2015	*Facilitator:* Kathy Mulligan, HC *Assistant(s):* Doreen Willett, Melanie Strout	13	10	6
Bar Harbor (Group 3)	*Core*: 2/4/2015 – **** *Post-Core*: ****	*Facilitator:* Doreen Willett *Assistant:* Karina Guzman	9	****	****
Deer Isle	*Core*: 11/10/2014 – 3/16/2015 *Post-Core*: 3/23/2015 –9/23/2015	*Facilitator:* Brenda Merritt, HC *Assistant:* Elizabeth Lyles	10	9	9

* Per NDPP Definition, those participants that attended at least 9 of the 16 core sessions. Due to changes in NDPP reporting standards for 2015, this is the number of participants that attended at least 9 classes in months 1-6 of the program.
** Per NDPP Definition, those participants that attended at least 3 of the 6 post-core sessions. Due to changes in NDPP reporting standards for 2015, this is the number of participants that attended at least 3 classes in months 7-12 of the program.
*** CHC = Community Health Center
**** Group has not finished core/post-core sessions.