

Maine Diabetes Prevention & Control Program Health Care Systems Intervention Focus Area:

EVALUATION OF A RISK FACTOR REDUCTION & PREDIABETES PILOT

Prepared for:



**Maine Center for Disease Control and Prevention
Maine Department of Health and Human Services**

HMP is a collaborative effort among 28 local coalitions, the Maine DHHS (Maine CDC and Office of Substance Abuse) and DOE, supported primarily by the Fund for Healthy Maine with federal grants from US CDC, SAMSHA, and DOE.

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I. ACKNOWLEDGEMENTS

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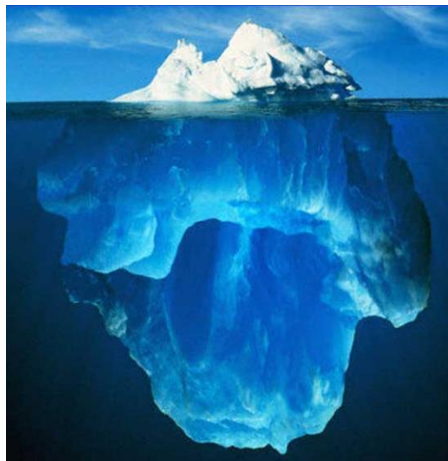
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II. EXECUTIVE SUMMARY

The societal costs of diabetes are significant. In 2007 dollars, the annual Medicaid costs due to diabetes are estimated at \$73,471,000.¹ The estimated prevalence of diabetes has increased from 3.5% of adults in 1995² to 10%.³ Maine cannot sustain these diabetes related costs or increases in diabetes prevalence. The Maine CDC/DHHS Diabetes Prevention and Control Program (DPCP) wanted to develop and implement a health care system intervention to prevent type 2 diabetes by focusing further upstream – on prediabetes – a condition where people have blood glucose levels, also called blood sugar, higher than normal but not high enough for a diagnosis of diabetes. Nationally, experts have used the image of an iceberg to describe the diabetes epidemic – referring to those with known diabetes to be the tip of the iceberg and those with prediabetes representing the huge mass of ice below the ocean’s surface (Figure 1). Research studies have found that moderate weight loss and exercise can prevent or delay type 2 diabetes among adults with prediabetes.⁴

Figure 1: The Diabetes Epidemic



• 18 million with known diabetes

• 57 million with prediabetes

¹ Centers for Disease Control and Prevention. Chronic Disease Cost Calculator: Version 1.0.3225. Available at: <http://www.cdc.gov/nccdphp/resources/calculator.htm>. Costs are in 2007 dollars.

² Behavioral Risk Factor Surveillance System, Maine Center for Disease Control and Prevention, Department of Health and Human Services. Program data, 2011.

³ OneMaine Health Collaborative: EMHS/MaineGeneral Health/MaineHealth. Statewide Community Health Needs Assessment 2010 http://www.une.edu/news/2011/upload/OMHC_Report_FINAL_20110408.pdf Accessed May 31, 2011.

⁴ Centers for Disease Control and Prevention. Diabetes Public Health Resource. <http://www.cdc.gov/diabetes/consumer/prevent.htm> Accessed on June 13, 2011.

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As this is a new area of focus, it was decided that the intervention would be piloted in one health care system, MaineGeneral Health Associates. MaineGeneral is Maine's third-largest health care system. It consists of a medical center with three campuses in Augusta and Waterville, Maine and physician practices serving the Kennebec Valley region.

An Advisory Group was created and was instrumental in the planning, implementation, and evaluation of the pilot. The DPCP and MaineGeneral selected and recruited a primary care practice site within the health care system to participate in the pilot. The primary care practice had demonstrated quality diabetes care through the National Committee for Quality Assurance. The primary care practice also exhibited a culture and leadership support that encouraged quality improvement.

The DPCP assisted MaineGeneral (MG) to provide an in-service training to the primary care practice staff on the pilot. One of the major components of the pilot was the development and use of a protocol for the diagnosis, treatment and referral for prediabetes. Another component was the development and use of a confidence ruler (a scale that allows patients to rate their readiness and motivation to make behavior changes to reverse or control their prediabetes) to determine what type of referral would be best for the patient. Ongoing technical assistance, site visits, and review of process and outcome data were some of the activities used to achieve pilot objectives. The DPCP and MaineGeneral focused on assisting the primary care practice to follow the protocol and increase the identification and control of prediabetes.

The evaluation of the Intervention Focus Area follows the framework for evaluation recommended by the US CDC in the publication, *Framework for Program Evaluation in Public Health* (1999). Although one purpose of the outcome evaluation is to examine the relationship between pilot activities and expected outcomes, the primary purpose is to improve pilot implementation and effect. It is hoped that by including the DPCP, MG and the primary care practice in the evaluation, that the evaluation itself will generate a positive influence.

The process evaluation suggests that the pilot intervention has been implemented with some success at the state, health care system and primary care practice levels. Despite many challenges, namely delays due to external factors such as a depressed economy and changes in staff, some important lessons were learned and processes have been improved. The DPCP and MaineGeneral have provided training and technical assistance to the primary care practice on the pilot. Three providers are using the protocol and ruler. Providers have begun to refer patients identified as having prediabetes to self-management programs and are providing these patients with educational materials developed for the pilot. Data reports were created to assist in setting primary care practice level objectives and monitoring progress towards these objectives. These reports can also be used as a primary care practice prediabetes registry.

It is too early in the pilot intervention to draw any conclusions from the outcome evaluation. Baseline and year 1 results show that the number of active patients age 45 years or older identified as having prediabetes was 8% (265 of 3351) in 2010. This is a slight increase from 6% (213 of 3582) in 2009. Of these patients identified as having prediabetes, 8% in both 2010 and

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2009 had a BMI measurement in the past year. Thirteen percent of those with a BMI measurement in the past year had a BMI of <25 in 2010. This was a slight decrease from 15% in 2009. Of those with an A1c measure in the past 3 years, 30% (48 out of 153) had an A1c of less than 5.7 in 2010, up from 25% (31 out of 126) in 2009.

Based on initial results, it is recommended that additional weight and BMI indicators be looked at as it appears that changes in the proportion of patients with prediabetes with a BMI less than 25 is too distal a measure. It is also recommended that the pilot be spread to another primary care practice that has demonstrated success in diabetes care and is interested in implementing additional strategies in preventing it. Other recommendations that may be helpful to the current and new primary care practices are to continue to: 1) train on and reinforce use of the protocol to reduce provider and staff resistance, 2) work with providers and staff to streamline the referral process, 3) explore training options for providers and staff on motivational interviewing to reduce patient resistance to attending or using self-management resources, and 4) work to set up a Living Well program (a chronic disease self-management program) directly at the primary care practice.

III. BACKGROUND

DIABETES PREVENTION AND CONTROL PROGRAM

The Maine Diabetes Prevention and Control Program (DPCP) is located within the Division of Chronic Disease, Maine Center for Disease Control and Prevention (CDC), Department of Health and Human Services. The DPCP has been funded by the U.S. Centers for Disease Control and Prevention, Division of Diabetes Translation (DDT) to implement a five year work plan (March 29, 2009 to March 28, 2014) consistent with DDT goals. DDT recently conducted a strategic planning process to help frame a long-term vision and committed to four Division goals that form the basis of a National Diabetes Program Framework.

The four National Diabetes Program Framework Goals are:

- 1) Prevent Diabetes
- 2) Prevent the complications, disabilities, and burden associated with diabetes
- 3) Eliminate diabetes-related health disparities
- 4) Maximize organization capacity to achieve National Diabetes Program goals

INTERVENTION FOCUS AREA

A requirement of the DDT is that state DPCPs conduct and evaluate an Intervention Focus Area. A health care systems intervention to improve the detection and control of prediabetes was chosen as an Intervention Focus Area for the following reasons:

- Maine cannot sustain the current increase in diabetes prevalence and must prevent diabetes
- Improving health care capacity to detect and control prediabetes is a priority in the state diabetes prevention and control strategic plan
- The burden of diabetes is substantial in Maine
- DPCP is well suited to partner with a major health care system to implement an intervention
- DPCP is capable of conducting a comprehensive evaluation to determine whether the pilot intervention is a promising practice and scale the intervention if appropriate

The DPCP health care systems Risk Factor Reduction and Prediabetes Control Pilot currently relates to three of the four National Diabetes Program Framework goals (1. Prevent diabetes; 2.

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Prevent the complications, disabilities, and burden associated with diabetes; and 4. Maximize organizational capacity to achieve the National Diabetes Program goals). The pilot will be tailored to reach a practice serving a disparate population in year 3 or 4 of the intervention and will then focus on all the goals of the National Diabetes Program Framework (3. eliminate diabetes-related health disparities).

As this is a new area of focus, it was decided that the intervention would be piloted in one health care system. The health care system in Augusta, MaineGeneral Health, agreed, to participate in the pilot. MaineGeneral is Maine's third-largest health care system. It consists of a medical center with three campuses in Augusta and Waterville, Maine and physician practices serving the Kennebec Valley region. MaineGeneral also focuses on preventive health and supports many ongoing programs throughout the communities they serve.

An Advisory Group was created and was instrumental in the planning and implementation of the pilot. It consists of staff from the following organizations:

- MaineGeneral Health: Jodi Beck, Janet Sawyer and Natalie Morse(Prevention Center), Elizabeth (Polly) Gosselin (Maine Quality Information Partners, Inc)
- DPCP: Cindy Hale, Program Coordinator (March 2009 to September 2010), Troy Fullmer, DPCP & CVH Program Manager (June 2010 to present), and Nathan Morse, Program Coordinator (December 2010 to present)
- University of New England – Center for Community and Public Health (Ruth Dufresne, Evaluator)
- Maine Cardiovascular Health Program (Elizabeth Foley, CVH Specialist – Office Systems and Stacy Meyer, CVH Specialist – Blood Pressure Master Trainer).

EVALUATION TEAM

The Division of Chronic Disease, Maine CDC has a multi-disciplinary evaluation contract through the University of New England – Center for Community and Public Health (CCPH) to evaluate the Healthy Maine Partnership (a statewide collaborative effort among 28 local coalitions, the Maine DHHS (Maine CDC and Office of Substance Abuse) and Department of Education to promote health and prevent and control chronic disease). The DPCP evaluation is included within the Healthy Maine Partnership evaluation. This facilitates the coordination of evaluation efforts. The HMP evaluation team consists of doctoral and masters prepared evaluators. The CCPH scientific advisor (Ronald Deprez) is a national expert in chronic disease prevention and control. He will supervise the DPCP lead evaluator (Ruth Dufresne) who is experienced in conducting comprehensive process and outcome evaluations of public health

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programs and using quantitative and qualitative methods that include, but are not limited to: clinical data from sources such as the Maine Health Management Coalition, Pathways to Excellence (PTE), electronic health records, web-based and telephone surveys, key informant in-person and telephone interviews, focus groups, and case studies.

METHODS

The evaluation of the Intervention Focus Area follows the framework for evaluation recommended by the US CDC in the publication, *Framework for Program Evaluation in Public Health* (1999). It is a multi-year evaluation that was created with input from the Advisory Committee. The evaluation includes a process evaluation that focuses on the quality and implementation of the intervention.

An outcome evaluation is built upon the process evaluation to assess the achievement of expected outcomes. Failure to complete a process evaluation in conjunction with an outcome evaluation makes it difficult to determine whether failure to achieve desired outcomes is due to the fact that the intervention was ineffective in bringing about the desired effect or due to ineffective or incomplete implementation.

Mixed methods, qualitative and quantitative, are used as they are most effective in providing a comprehensive evaluation. Qualitative methods are best suited to tell how, and in what ways, an intervention was implemented, whether the intervention was successful or not, and recommend ways to improve the intervention. Quantitative methods are compatible for quantifying various aspects of the intervention. The process evaluation is conducted as part of the overall program evaluation and consists of a review of program materials to determine whether strategies were implemented as planned or whether expected outputs were produced. The evaluator assists staff to collect process data for measurable objectives. The primary process data source consists of key informant interviews and meetings with DPCP, MaineGeneral Health, and primary care practice staff to capture perceptions regarding the implementation and impact of and the facilitators and barriers to the pilot intervention. The evaluator conducts these annually. The primary outcome data source is patient data from the primary care practice electronic health record.

PURPOSE OF EVALUATION REPORT

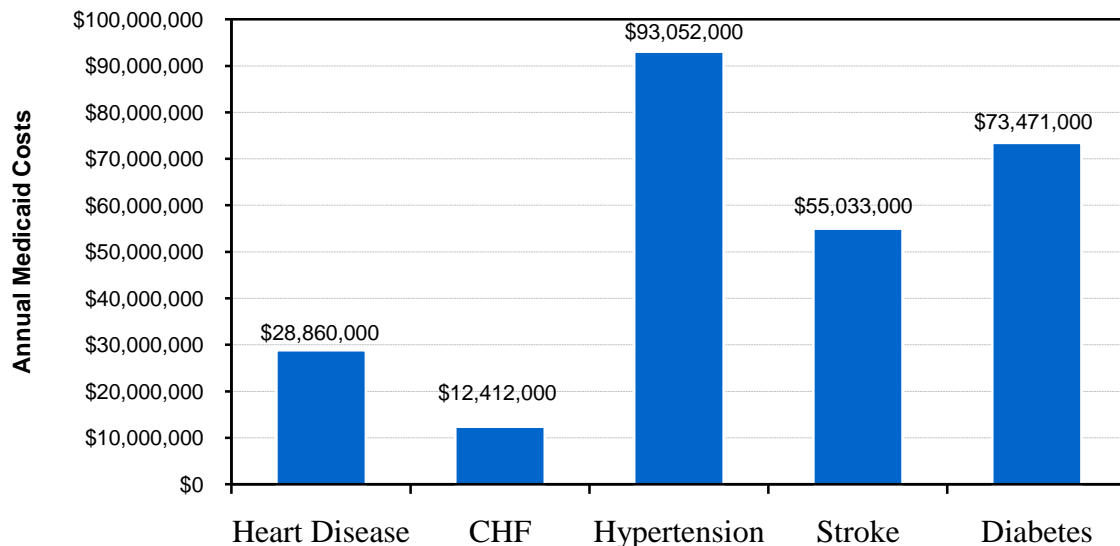
The purpose of this evaluation report is to provide an in-depth look at the Intervention Focus Area. The evaluation includes process and outcome evaluation. Given that this is the end of the second year of a five year intervention and funding cycle, the evaluation focuses more on process this year. Outcome data, although provided in this report, will be a larger focus in the later years.

IV. INTERVENTION DESCRIPTION

NEED

The societal costs of diabetes are significant. In 2007 dollars, the annual Medicaid costs due to diabetes are estimated at \$73,471,000 (Table 1). The estimated prevalence of diabetes has increased from 3.5% of adults in 1995 to 8.3% in 2009.⁵ A recent study estimated the overall diabetes prevalence in Maine to be 10% (U.S. 8.0%), with higher rates in Aroostook (13%), Oxford (12%), Piscataquis (13%), and Washington (13%) counties.⁶

Table 1. Annual Medicaid Costs Due to Cardiovascular Diseases and Diabetes, Maine



Source: Centers for Disease Control and Prevention. Chronic Disease Cost Calculator: Version 1.0.3225.

Available at: <http://www.cdc.gov/nccdphp/resources/calculator.htm>. Costs are in 2007 dollars. CHF: Congestive Heart Failure.

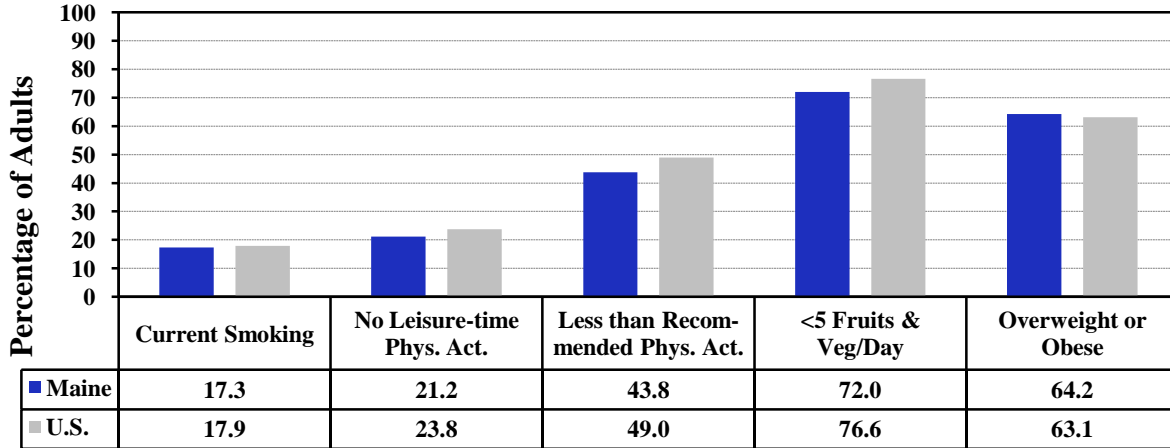
Maine cannot sustain these diabetes related costs or increases in diabetes prevalence. Even though the prevalence of risk factors for diabetes (physical inactivity and low fruit and vegetable consumption) are about the same over the past five years, the prevalence of overweight and

⁵ Behavioral Risk Factor Surveillance System, Maine Center for Disease Control and Prevention, Department of Health and Human Services. Program data, 2011.

⁶ OneMaine Health Collaborative: EMHS/MaineGeneral Health/MaineHealth. Statewide Community Health Needs Assessment 2010
http://www.une.edu/news/2011/upload/OMHC_Report_FINAL_20110408.pdf Accessed May 31, 2011.

obesity has increased over this time⁷ and is slightly higher than the US prevalence (Table 2). With few exceptions, the counties with higher diabetes prevalence rates are also the counties with the highest prevalence of obesity and sedentary lifestyles.⁸

Table 2. Prevalence of Selected Risk Factors, Maine & U.S. Adults, 2009



Source: Behavioral Risk Factor Surveillance System, Maine Center for Disease Control and Prevention, Department of Health and Human Services. Program data, 2011.

Seminal studies have found that type 2 diabetes can be prevented. The Diabetes Prevention Program (DPP) was a major multicenter clinical research study to determine whether modest weight loss through improved healthy eating and increased physical activity or treatment with metformin could prevent or delay the onset of type 2 diabetes. At the beginning of the DPP, participants were all overweight and had blood glucose, also called blood sugar, levels higher than normal but not high enough for a diagnosis of diabetes—a condition called prediabetes. The DPP found that participants who lost a modest amount of weight sharply reduced their chances of developing diabetes. Taking metformin also reduced risk, although less dramatically.^{9, 10}

⁷ Behavioral Risk Factor Surveillance System, US Centers for Disease Control and Prevention. <http://apps.nccd.cdc.gov/BRFSS/display.asp> Accessed on May 27, 2011.

⁸ OneMaine Health Collaborative. EMHS/MGH/MH. Statewide Community Health Needs Assessment 2010. http://www.une.edu/news/2011/upload/OMHC_Report_FINAL_20110408.pdf Accessed on May 27, 2011.

⁹ National Diabetes Information Clearinghouse: A service of the National Institute of Diabetes and Digestion and Kidney Disease (NIDDK), NIH <http://diabetes.niddk.nih.gov/dm/pubs/preventionprogram/> Accessed on May 20, 2011.

¹⁰ Brink S. The Diabetes Prevention Program: How the participants did it. Health Affairs 2009; 28(1): 57-62.

Other studies have adapted the DPP to the community¹¹ or worksite setting¹² and achieved reductions in weight and some reductions in blood glucose or other biometric measures. One study in a medium sized primary care practice in the United Kingdom on life style intervention with patients with prediabetes found a statistically significant difference between control and intervention groups in three markers for risk of progression to diabetes [weight (P<0.03), BMI (P<0.03), and waist circumference (P<0.001)].¹³

PILOT SUMMARY

The DPCP and MaineGeneral Health selected and invited a primary care practice site within the health care system that had:

- A high prevalence of prediabetes relative to other MaineGeneral Health practices per electronic health record (EHR) data;
- Demonstrated quality diabetes care through recognition from either the National Committee for Quality Assurance or the Maine Health Management Coalition's Pathways to Excellence (an initiative to measure and improve the quality of health care services in Maine); and
- A practice culture and leadership support that supported and encouraged quality improvement.

The DPCP assisted MaineGeneral Health to provide an in-service to the primary care practice staff on the pilot. The major component of the pilot was the development and use of a protocol for the diagnosis, treatment and referral for prediabetes (Appendix A). Ongoing technical assistance, site visits as needed, and review of process and outcome data to gauge progress toward pilot objectives are the chief methods used to assist the primary care provider in following the protocol and increasing the identification and control of prediabetes and ultimately reducing the rate of progression to diabetes.

¹¹ Ackermann RT, Finch EA, Brizendine E, Zhou H, Marrero DG. Translating the Diabetes Prevention Program into the community: The DEPLOY pilot study. *American Journal of Preventive Medicine* 2008;35(4):357-363.

¹² Aldana S, Barlow M, Smith R et al. A worksite diabetes prevention program. *American Association of Occupation Health Nurses Journal* 2006: 54(9): 389-395.

¹³ Barclay C, Procter KL, Glendenning R et al. Can type 2 diabetes be prevented in UK general practice? A lifestyle-change feasibility study (ISALAH). *British Journal of General Practice* 2008 Aug;58(553):541-7.

LOGIC MODEL

An intervention logic model was developed to graphically show the relationship between the intervention activities and the intended effects (Appendix B). The logic model is updated annually, as needed, to reflect changes in knowledge or contextual factors.

GOAL, OBJECTIVES AND ACTIVITIES

The proposed goals, objectives and activities are described below. The health care system was involved in the development of the intervention. The Advisory Committee developed program level objectives that were general in scope. The DPCP and MaineGeneral Health have not yet worked with the primary care practice site to develop SMART (specific, measurable, achievable, realistic and time-phased) objectives at the practice level, but this is planned for spring 2011.

Goal: Develop health care system changes that prevent diabetes

Objectives:

By March 2010, partner with at least one large health system in Maine to train at least five clinical staff on the risk factor reduction and prediabetes control pilot intervention.

By March 2011, increase the number of patients identified as prediabetic in the pilot primary care practice(s).

By March 2012, increase the number of patients identified as prediabetic who are referred to self-management.

By March 2013, increase the proportion of patients in pilot primary care practice(s) identified as prediabetic who participate in self-management.

By March 2014, increase the number of patients in pilot primary care practice(s) identified as prediabetic who have their prediabetes under control.

Activities:

- Advisory Committee meets at least quarterly to assist with implementation & monitoring of pilot intervention

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- DPCP and MaineGeneral Health provides training and technical assistance to primary care practice site to implement the pilot intervention:
 - 1) Use the protocol to correctly identify patients with prediabetes
 - 2) Develop referral mechanisms that work for the primary care practice site
 - 3) Assist with outreach and follow-up to get patients with prediabetes the appropriate self-management support (DVD and action plan, Move More and Living Well)
 - 4) Evaluate the pilot intervention
 - 5) Spread lessons learned and scale the pilot to additional primary care practice sites as appropriate

V. EVALUATION

PLAN

Evaluation planning was included at the start of this pilot intervention. A collaborative process between the Advisory Council and the UNE evaluator is used to implement the evaluation plan. At each step of the evaluation framework, stakeholders are involved to ensure that the evaluation is useful and meets the needs of DPCP and MaineGeneral Health. The evaluation plan is based on the intervention logic model, follows the framework for evaluation recommended by the CDC in the publication, *Framework for Program Evaluation in Public Health*, and includes evaluation questions by domain, indicators, data sources, how the data will be analyzed, responsibility for data analysis, and timeframe for analysis (Appendix C). The evaluation plan is a multi-year evaluation plan that is updated annually with stakeholder input. It is a working document that evolves as the intervention progresses and the knowledge-base expands. As prediabetes is a new focus for health care systems in Maine, and the pilot intervention is new, the purpose of the process evaluation is to provide insight and clarity on how program activities should be designed and implemented to bring about expected changes and to improve the quality, effectiveness, or efficiency of program activities.

Evaluation results are documented at the end of each year and provided to the Advisory Council by the evaluator on an ongoing basis. An evaluation report or fact sheets will be provided to the DPCP and stakeholders annually. Recommendations for program improvement are included in the annual evaluation report. Additionally, evaluation findings are used to inform program planning and implementation and revisions of the evaluation plan. At the end of the five year evaluation, the results will be disseminated to national partners and counterparts and will contribute to the knowledge-base of what is, or is not, a promising practice for diabetes health care systems interventions. Table 3 summarizes the key steps of the evaluation.

Table 3. Key Steps¹⁴ in Evaluating the Maine CDC, Diabetes Prevention and Control Program Health Care Systems Intervention Focus Area: Risk Factor Reduction and Prediabetes Control Pilot

Step	Why It Is Important	Activity/Application to the DP Evaluation	Lessons Learned
1. Engage stakeholders	Stakeholders must be engaged in the evaluation to ensure their perspectives are understood and that the evaluation addresses important elements of a program's objectives, operations, and outcomes. Meeting with key stakeholders to plan the evaluation is essential for prioritizing evaluation questions and identifying or creating data sources to answer evaluation questions.	The University of New England – Center for Community and Public Health (CCPH) evaluator works with the DPCP and MG to develop evaluation questions, the evaluation plan, data collection instruments and all aspects of the evaluation.	Attending the Advisory Committee meetings has been very helpful for the evaluator to establish relationships with stakeholders, gain an understanding of the pilot, and solicit and provide input on the pilot and evaluation.
2. Describe the intervention or program	Program descriptions convey the mission and objectives of the program being evaluated. One method used to describe a program—a logic model—depicts the series of actions and causes expected to lead to desired outcomes.	An intervention logic model was drafted by the evaluator and shared with DPCP and stakeholders to review and revise for accuracy. The intervention logic model outlines the various steps for implementation and expected short-term, intermediate, and long-term outcomes. In addition, goals and long-term, intermediate and short-term objectives were drafted to guide the intervention.	Presenting the logic model to the Advisory Committee at the outset of the pilot was helpful for the evaluator.
3. Focus the evaluation a. Design—develop key evaluation questions	Developing key evaluation questions provides a framework for the evaluation's focus. Given time and resource constraints, prioritizing tasks that will be feasible to evaluate is important.	An initial set of evaluation questions was drafted by the CCPH evaluator and shared with stakeholders for their review and feedback. Evaluation questions are prioritized and revised as needed based on stakeholder input.	It was helpful to get stakeholder input on prioritizing the evaluation questions as there are not sufficient resources or time to answer all of them.

¹⁴ The table was adapted from the Centers for Disease Control and Prevention. 1999. Framework for program evaluation in public health. *MMWR*, 48(No. RR-11) and the Maine Center for Disease Control and Prevention. 2008. CDC/RTI Promising Practices Research Project. Maine HeartSafe Communities, Summary Report. <http://healthymainepartnerships.org/mcvhp/documents/HSCReport.pdf> Accessed on December 4, 2008.

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Step	Why It Is Important	Activity/Application to the DP Evaluation	Lessons Learned
3. (cont.) b. Develop an evaluation plan	An evaluation plan provides direction and focus to assess the issues of greatest concern to stakeholders while using time and resources as efficiently as possible. An evaluation plan helps organize the evaluation by outlining the key evaluation questions, indicators by which to assess the questions, data sources to use, responsibilities for data collection, and timeline for data collection.	The evaluation plan was developed with stakeholder involvement and serves as a guide for the evaluation. The evaluation is based on the CDC Evaluation Framework and includes: evaluation questions; indicators; data sources; responsibility for data collection; and timeline. The evaluation plan is implemented and updated as needed.	Involving the Advisory Committee in the development of the evaluation plan was helpful and may make the evaluation more useful to them.
3. (cont.) c. Develop data collection instruments	Data collection instruments guide how data will be collected. They should be developed with and/or reviewed by the organization whose program is being evaluated to ensure feasibility. Types of instruments include surveys, interview guides, observation forms, and data tracking forms.	Possible data collection instruments for the evaluation include but are not limited to: <ul style="list-style-type: none"> • Primary care practice (PCP) data and aggregate patient data from the electronic health record • Interviews with key DPCP and MG staff • Program and PCP reports/budget 	Involving the Maine Quality Information Partners was critical in extracting data from the MaineGeneral EMR.
4. Gather credible evidence	Process and outcome indicators are necessary to show whether the pilot is being implemented as planned and achieving the desired results. Data collection, quantitative or qualitative, provides a means to describe and assess the program. The type of data collection conducted depends on the data sources available.	Indicators and quality improvement data reports were developed. The data collection instruments include the means to collect both quantitative and qualitative data. (See instruments above.)	The health care system and primary care practice are familiar with standard quality improvement measures, but less familiar with evaluation terminology.
5. Justify conclusions	The evaluation conclusions are justified when they are linked to the evidence gathered and judged against agreed-upon values or standards set by the stakeholders. Data analysis,	The CCPH evaluator will analyze quantitative and qualitative data to determine whether policy and environmental changes have occurred in the health care system and primary care	The health care system and primary care practice were helpful in interpreting the EMR data.

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Step	Why It Is Important	Activity/Application to the DPCP Evaluation	Lessons Learned
	quantitative or qualitative, provides a means to assess and provide answers to the key evaluation questions.	practices participating in the DPCP's intervention and whether improvements in markers for risk of progression to diabetes (weight and BMI) and control is achieved among patients identified as having prediabetes.	
6. Ensure use and share lessons learned	Lessons learned in the course of an evaluation do not automatically translate into appropriate action. Reporting findings provides a way to describe the program, disseminate evaluation results, and provide recommendations to key stakeholders about future implementation and evaluation.	<p>To complete and continue the circle of the CDC Evaluation Framework, the CCPH evaluator participates regularly in the Advisory Committee meetings. Evaluation is an ongoing agenda item and Continuous Quality Improvement is built into implementation of the pilot.</p> <p>MG provides reports and updates at quarterly meetings on process and outcome measures for evaluation.</p> <p>Additionally, the evaluator works with the DPCP to create written reports or fact sheets summarizing the evaluation results and share these with stakeholders as appropriate and at least at the conclusion of the intervention. The evaluation can be used by the DPCP and stakeholders to guide future planning and implementation.</p>	<p>It is important the needs of the DPCP and MaineGeneral are both met and that the evaluation balances the need to not burden MaineGeneral or the primary care practice and yet still gathers the data needed to complete a process and outcome evaluation.</p> <p>Collecting and reviewing both process and outcome data is useful to provide a well-rounded picture of the intervention. Incorporating evaluation at each quarterly meeting as part of Continuous Quality Improvement is helpful.</p>

RESULTS

Inputs

Program Staffing: Table 4 highlights the responsibilities of each of the key individuals involved in implementing the pilot intervention.

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Table 4. Staff and Partner Responsibilities for the Maine CDC, Diabetes Prevention and Control Program Health Care Systems Intervention Focus Area: Risk Factor Reduction and Prediabetes Control Pilot

Team Member	Estimated Time/ Month	Responsibilities
DPCP Program Manager	2-3% (Note: there has been staff turnover and vacancies in this position during FY 2010.)	<ul style="list-style-type: none"> • Manage intervention, program staff, and budget • Establish program goals and objectives for intervention • Identify how intervention can be used to help meet DPCP goals • Facilitate the partnership with Health Care System • Help to plan intervention activities
DPCP Program Coordinator	10% (Note: there has been staff turnover and vacancies in this position during FY 2010.)	<ul style="list-style-type: none"> • Program Manager duties during vacancy • Partner with health care system to develop and implement the intervention • Oversee day-to-day intervention implementation. • Serve as point of contact for intervention partners. • Distribute intervention resources/materials and respond to technical assistance requests. • Respond to questions about the intervention and training.
DPCP Evaluator	10% of .25 FTE	<ul style="list-style-type: none"> • Program evaluation and data analysis. • Conduct focus groups and key informant interviews • Follow-up surveys • Assist with process evaluation • Conduct outcome evaluation
MaineGeneral Prevention Center Program Manager	10% of 1 FTE	<ul style="list-style-type: none"> • Manage intervention • Conduct in-service with primary care practice • Provide technical assistance to primary care practice to improvement intervention
MaineGeneral Clinical Quality Improvement Manager	10%	<ul style="list-style-type: none"> • Provide administrative support and technical assistance in implementation of intervention at pilot site. • Provide clinical expertise in prediabetes, diabetes and hypertension management

Program Costs: The DPCP Health Care System Intervention costs were \$5,150 (year 2). Table 5 provides a breakdown of the program costs.

Table 5. Estimated Costs of the Maine CDC, Diabetes Prevention and Control Program Health Care Systems Intervention Focus Area: Risk Factor Reduction and Prediabetes Control Pilot

Expense	Costs
Staff time—DPCP staff	In kind
Support Staff time	In kind
MaineGeneral Staff Time	In kind
Printing of protocol algorithm & Confidence Ruler	\$100
Data extraction from EMR –MaineGeneral subcontractor	\$5,000
Other print materials	\$50
In-service	In - kind
TOTAL	\$ 5,150

Implementation / Process Evaluation

The DPCP has completed year two of a five year health care systems intervention (March 29, 2009 to March 28, 2014) to improve the detection of prediabetes, increase the referral of people identified as pre-diabetic to self-management programs, increase the participation in these programs, and improve the control of risk factors and prediabetes. The evaluator reviewed Advisory Group meeting notes, program reports, and conducted interviews with key staff and partners using the questions in the evaluation plan matrix (Appendix C). Key findings from this review follow.

The major accomplishments for Year 2 were:

1. Providers (2 Medical Doctors and 1 Nurse Practitioner) were trained at one primary care practice site on the pilot, protocol, and confidence ruler.
2. All 3 providers are using the protocol and ruler.
3. Providers have begun to refer patients identified as having prediabetes to self-management programs and providing them with the DVD.
4. Data reports were created to assist the primary care practice in setting and monitoring progress towards objects. These reports can also be used as a prediabetes registry for the primary care practice and are used to evaluate the pilot.
5. MaineGeneral Health and DPCP visited the primary care practice site to begin to set practice-level SMART objectives.
6. Protocol updated based on Year 1 experience.

Table 6 lists the key steps in implementing Maine’s risk factor and prediabetes and diabetes health care systems intervention to improve the prevention, detection and control of prediabetes.

Table 6. Key Steps in Implementing Maine’s Risk Factor Reduction and Prediabetes Control Pilot

Step	Why It Is Important & How It Was Done	Lessons Learned & Next Steps
<p>Assist PCP to use the protocol to correctly identify patients with prediabetes</p>	<p>The 1st step in preventing diabetes is to identify those at risk and help them to reduce their risk. A recent study suggests that creating diabetes risk awareness and counseling on lifestyle change by a health care provider may help to prevent those with prediabetes from progressing to diabetes.¹⁵</p> <p>The protocol that was developed by DPCP and MaineGeneral Health does just that. Due to upcoming changes in MaineGeneral’s EMR, the protocol could not be built into the EMR. It is not clear whether this will be possible with the new EMR that will be launched in fall 2011. For this reason, a laminated, user-friendly sheet was used for the protocol. The protocol was tested and reviewed by providers. The primary care practice was asked to post the protocol in a place where the provider and support staff would see it.</p>	<p>The protocol has undergone many drafts. The protocol was initially shared with a sub-set of the primary care practice staff (1 - MD, 1 - NP, 1 – LCSW). That worked for the beginning of implementation. This primary care practice experienced provider turnover and the MD trained on pilot moved. Another MD was trained on the pilot. As the pilot progressed, it became apparent that all staff needed to be trained on the protocol and this was done. At this training/meeting, provider & staff fatigue was identified as a barrier.</p> <p>Next steps:</p> <ul style="list-style-type: none"> • Continue training on and reinforce use of protocol to reduce provider and staff resistance. • Develop timeline and mechanism for periodic retraining on protocol, reminders to use the protocol, and re-distribute or post in exam rooms.
<p>Assist primary care practice to develop referral mechanisms that work for the primary care practice</p>	<p>It is important that a health care provider explain to the patient diagnosed with prediabetes that a referral is being made for self-management and it is important that the patient attend. Support staff, however, can make the</p>	<p>Developing a mechanism that works for different providers within the primary care practice has been a challenge. The primary care practice is stretched very thin and there is little time to perform additional tasks.</p>

¹⁵ Okosum IS, Lyn r. Prediabetes awareness, healthcare provider’s advice and lifestyle changes in American adults. International Journal of Diabetes mellitus. Jan. 3, 2001.
[http://www.intldiabetesmellitus.com/article/S1877-5934\(10\)00107-4/abstract](http://www.intldiabetesmellitus.com/article/S1877-5934(10)00107-4/abstract)

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Step	Why It Is Important & How It Was Done	Lessons Learned & Next Steps
	<p>actual referral. Currently the provider makes the referral (MD, DO or NP). The care manager helps to facilitate the referral and gives the pt the info about enrolling. This is still an area that needs further exploration for ways to follow-up to encourage the patient to attend.</p>	<p>Next steps: Continue to streamline the referral process and work with primary care practice to find solutions.</p>
<p>Assist primary care practice with outreach and follow-up to get referred patients to appropriate self-management support (action plan, Move More and Living Well)</p>	<p>People have busy lives, not all patients referred to self-management are ready to take action. Sometimes some motivational interviewing or additional encouragement is required. MGPC has sent follow-up letters to patients with prediabetes referred to self-management that have not attended.</p>	<p>Getting referred patients to attend a self-management program or use resources has been a challenge. The tobacco cessation field could be a resource as it is also an area where patient resistance to use cessation resources and behavior change programs is high. The providers that are using the protocol sometimes refer patients to self-management that are not appropriate for this pilot. Mechanisms are not in place for the primary care practice to send information to MGPC on a regular basis on patients who have been given DVDs. This process needs to be streamlined. Next steps: Explore training options for providers and staff on motivational interviewing to reduce patient resistance to attending or using self-management resources. Another barrier that was identified was the lack of a self-management program close to the primary care practice site. MGPC and the primary care practice are working to set up a Living Well program directly at the primary care practice site.</p>

Outcome Evaluation

Although a purpose of the outcome evaluation is to examine the relationship between pilot activities and expected outcomes, the primary purpose is to improve pilot implementation and effect. It is hoped that by including the DPCP, MG and the primary care practice in the evaluation, systematic reflection can be a catalyst for self-directed change and that the evaluation itself will generate a positive influence.

The status as of the end of Year 1 of implementation is summarized in Table 7. The number of active patients age 45 years or older identified as having prediabetes was 8% (265 of 3351) in 2010. This is a slight increase from 6% (213 of 3582) in 2009. Of these patients identified as having prediabetes, 8% in both 2010 and 2009 had a BMI measurement in the past year. Thirteen percent of those with a BMI measurement in the past year had a BMI of <25 in 2010. This was a slight decrease from 15% in 2009. Eighty-seven percent of patients identified as having prediabetes had a BP measurement in the past year (230 of 265) in 2010. This is about the same as in 2009 (88%, 197 of 213). In both years, 56% had their blood pressure under control at their most recent measurement (104 out of 187 – 2009; 128 out of 230 – 2010). Of those with an A1c measure in the past 3 years, 30% (48 out of 153) had an A1c of less than 5.7 in 2010, up from 25% (31 out of 126) in 2009.

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Table 7. Progress Toward Outcomes

Logic model number and short, intermediate and long-term outcome	Indicator	Year 1 (3/29/10)	Year 2 3/28/11
4.1 Increased provider use of protocol/referral to self-management	Number of providers (MD, DO, NP, PA) using prediabetes protocol /referring pts with prediabetes	0	3
4.2 Increased number of at risk people (age, BMI and other risk factors per ADA) identified as pre-diabetic	Proportion of active pts >= 45 years identified as having prediabetes	6% (213 of 3,582)	8% (265 of 3,351)
4.3 Increased number of pts with pre-DM receiving self-management education (DVD) & creating action plans	Number of patients with prediabetes given prediabetes DVD - "You Can Do Something"	NA	16
	Number of patients given prediabetes DVD who completed an action plan	NA	0
4.4 Increased referral of pts with pre-DM to self-management programs (LW, MM)	Number of patients with prediabetes referred to Living Well	NA	8
	Number of patients with prediabetes referred to Move More	NA	11
4.5 Increased participation in self-management program (LW, MM), by patients with pre-DM at pilot primary care practice	Number of patients referred to and completing Living Well	NA	2
	Number of patients referred to and enrolling Move More	NA	0
5.1 Improved markers for risk of progression to diabetes (weight & BMI) among patients with pre-DM at pilot PRIMARY CARE PRACTICE	Proportion of active pts age >= 45 years identified as having prediabetes AND having most recent BMI measure in past year <25	15% (26 out of 171)	13% (28 out of 211)
5.2 Increased control of FPGT, A1c, BP, and cholesterol among patients with Pre-DM	Proportion of active pts >= 45 years identified as having prediabetes AND having most recent BP within the past year < 130/90	56% (104 out of 187)	56% (128 out of 230)

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Logic model number and short, intermediate and long-term outcome	Indicator	Year 1 (3/29/10)	Year 2 3/28/11
	Proportion of active pts \geq 45 years identified as having prediabetes AND with most recent FPG result in past 3 years $<$ 100	31% (66 out of 212)	23% (61 out of 262)
	Proportion of active pts \geq 45 years identified as having prediabetes AND having most recent A1c in the past year $<$ 5.7	25% (31 out of 126)	30% (48 out of 153)

VI. LIMITATIONS

The lessons learned are subjective. The process data (number of referrals) is pulled from the electronic health record (EHR) and very likely an underestimate of referrals as documentation of referral to self-management for prediabetes is not done as routinely as for diabetes, labs, or screenings. The outcome data (Aa1c, BMI) also comes from the EHR and may be incomplete or incorrect as data were not validated.

Additionally, the primary purpose of the evaluation is to improve pilot implementation and outcome. It is hoped that by including the DPCP, MG, and the primary care practice in the evaluation, systematic reflection may be a vehicle for quality improvement and that the evaluation itself will generate a positive influence.

VII. CONCLUSIONS AND RECOMMENDATIONS

The process evaluation suggests the pilot intervention has been implemented with some success at the state, health care system and primary care practice levels. Despite many challenges, namely delays due to external factors such as a depressed economy and changes in staff, some important lessons were learned and processes have been improved. It is too early in the pilot intervention to draw any conclusions from the outcome evaluation. Based on initial results, however, it is recommended that additional weight and BMI indicators be looked at as it appears that changes in the proportion of patients with prediabetes with a BMI less than 25 is too distal a measure. It could be that average weight and BMI are decreasing, but patients have not yet reached the goal of a BMI <25. It is recommended that the pilot be spread to another primary care practice that has demonstrated success in diabetes care and is interested in preventing it. It may be useful to choose a primary care practice that has a different structure for the care manager position (e.g. nurse vs. a social worker).

APPENDIX A: PROTOCOL

Reference Card for Detection, Evaluation, Treatment and Referral for Pre-Diabetes and Diabetes

Reference card developed based on the American Diabetes Association: Standards of medical care in diabetes - 2009. Diabetes Care 2009; 32, Supplement 1

SCREENING GUIDELINES per ADA

- 1) Age \geq 45 **OR**
- 2) Overweight (BMI \geq 25) **AND** has any of these additional risk factors:
 - Physical inactivity
 - First degree relative with diabetes
 - Member of a high-risk ethnic population
 - A woman who delivered a baby weighing $>$ 9 pounds or was diagnosed with gestational diabetes
 - Hypertension (\geq 140/90)
 - HDL cholesterol level $<$ 35 or a triglyceride level $>$ 250
 - A woman with polycystic ovarian syndrome
 - Impaired glucose tolerance (IGT) or Impaired fasting glucose (IFG) on previous testing
 - Other clinical conditions associated with insulin resistance
 - History of CVD

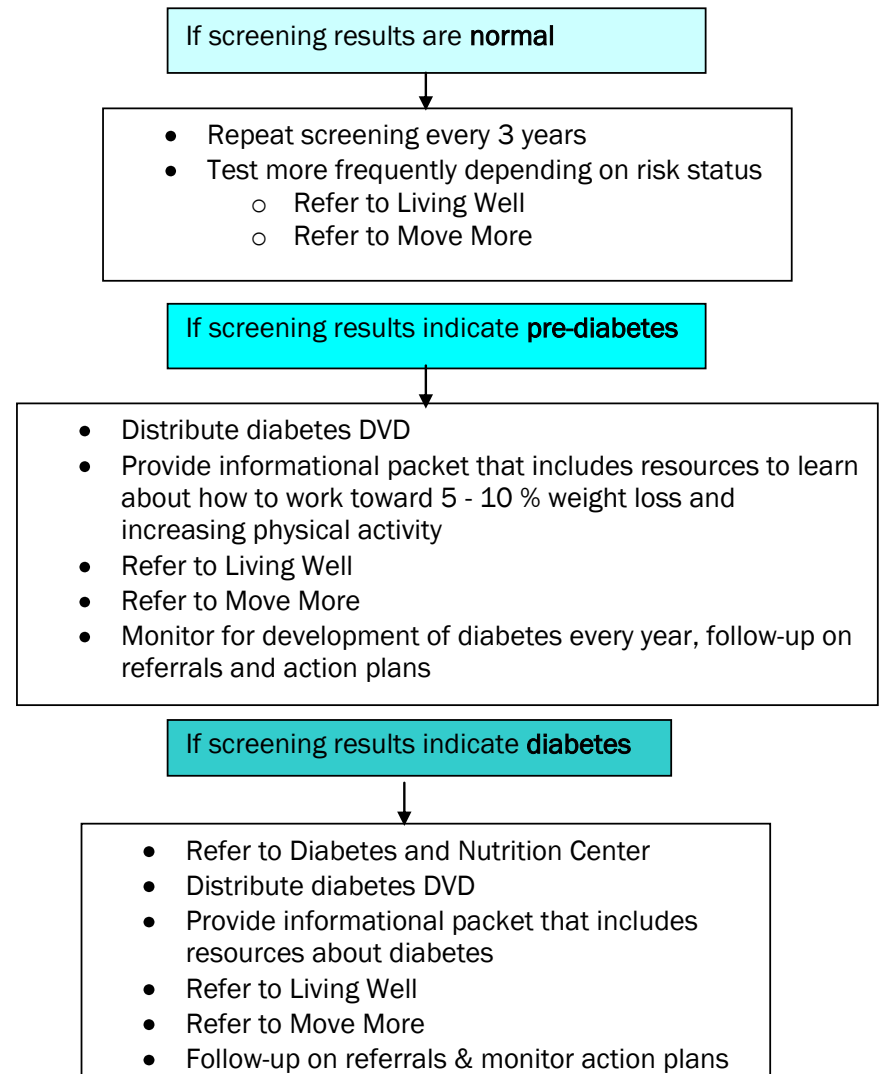
EVALUATION

Classification of Pre-Diabetes and Diabetes
(repeat testing on subsequent day to confirm)

	Fasting plasma glucose mg/dl	A1C	OGTT 2 hour
Normal	$<$ 100	$<$ 5.7	$<$ 140
Pre-diabetes	100-125	5.7-6.4	140-199
Diabetes	\geq 126	\geq 6.5	$>$ 200

The committee chose to present the guidelines from the American Diabetes Association in an effort to better identify, treat and refer people with pre-diabetes or diabetes. The committee realizes that some physicians may follow other guidelines and hopes that some of this information will be useful to all physicians.

TREATMENT



REFERRAL

Living Well is a six week interactive workshop designed to help people learn better ways of coping and managing their health. Some of the activities in the workshops are setting goals, finding support and solutions to health concerns, relaxing and managing stress, making daily tasks easier and working in partnership with a healthcare team.

Move More is a free program for people who want to be more active. The key to the Move More Project is a group of "Movers" or champions in the community or workplace who provide support to people who enroll.

Move More offers:

- Support from a "Mover"
- A pedometer
- Physical Activity Guide
- Nutrition Guide
- Maps of outdoor walking trails
- Lists of indoor walking spaces in your area
- Physical activity log sheets
- Physical activity resources

The **Diabetes DVD** is a short DVD featuring real Maine people who have pre-diabetes or diabetes. It has 3 goals:

1. Inform adults with a diagnosis of pre-diabetes or diabetes that this diagnosis is serious and requires skill building.
2. Inform adults with pre-diabetes or diabetes that supports and services are available in the community if they want treatment and education.
3. Inform adults with pre-diabetes or diabetes and their family members that thousands of Maine people with pre-diabetes or diabetes are doing nothing and need encouragement to make a change.

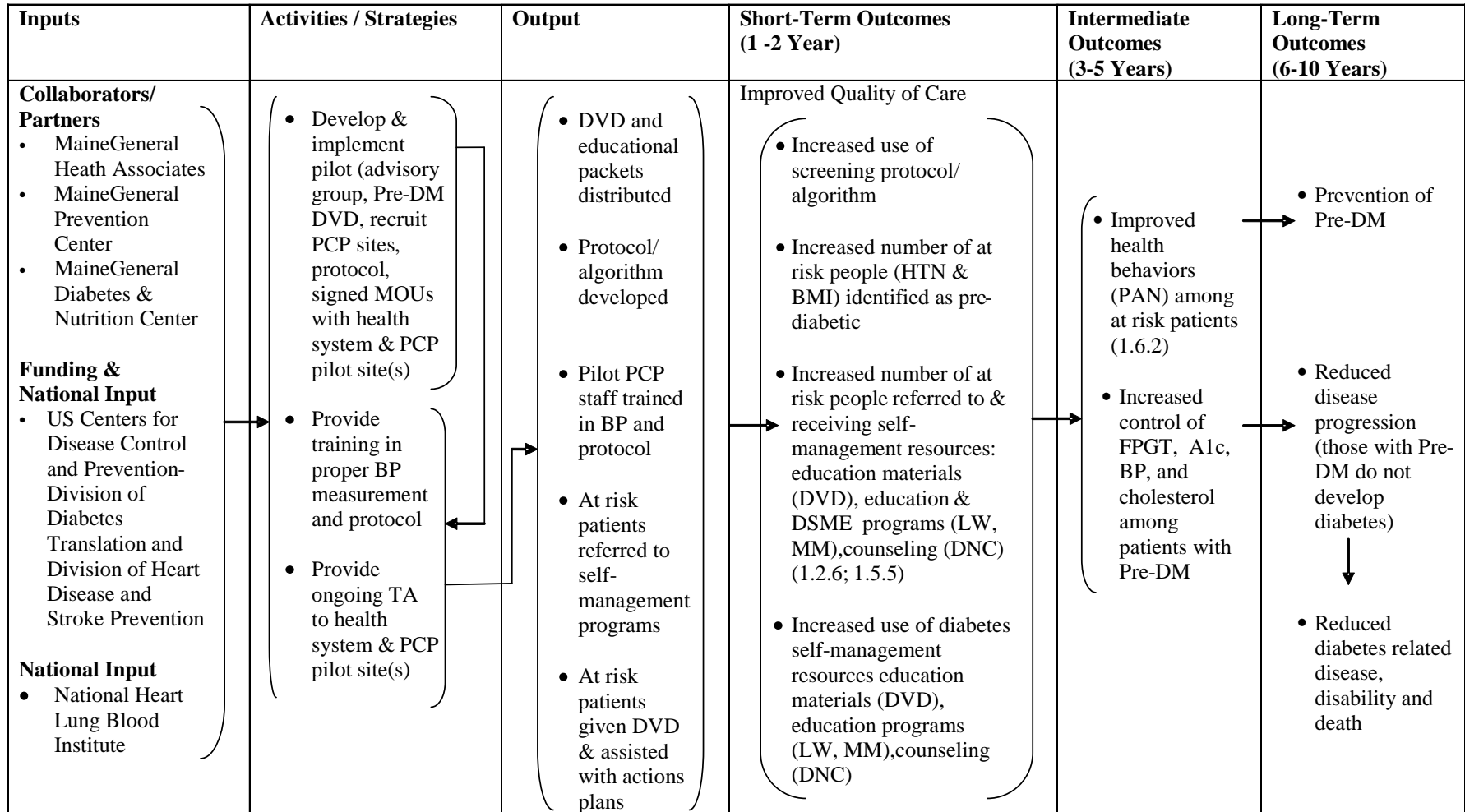
The **Informational Packet** includes local, state and national resources available for individuals interested in gaining knowledge and pursuing strategies for weight loss and healthier eating.

The **MaineGeneral Diabetes and Nutrition Center** provides comprehensive diabetes services designed for patients who have been newly diagnosed; have trouble controlling their diabetes or who need long-term care and follow-up. They are recognized by the American Diabetes Association for meeting national standards for Diabetes Self-Management Education.

This algorithm was developed by the Blood Pressure – Pre-Diabetes Intervention Planning Committee whose members include: Maine CDC-Diabetes Prevention and Control Program, Maine CDC-Cardiovascular Health Program and MaineGeneral Health. Approved: September 2009. **This is an update, drafted 02/11**

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APPENDIX B: LOGIC MODEL FOR MDPCCP & CVHP HEALTH CARE RISK FACTOR & PREDIABETES PILOT INTERVENTION 2009-2014



APPENDIX C: EVALUATION PLAN MATRIX

Summary Evaluation Plan

Question Type	Evaluation Question(s)	Indicator(s)	Data Sources	Data Analysis/ Responsibility	Timeframe
Adoption					
Participation	What percentage of staff is trained in accurate BP measurement and pre-diabetes prevention and control guidelines?	Percentage of staff trained	Training Evaluation	Quantitative analysis, calculate percentage/ Eval	Jan 2010
Staff	What percent of time do state staff dedicate to the DPCP Healthcare Systems Intervention?	% time each FTE spends on Healthcare Systems Intervention	Interviews with MDPCP staff	Quantitative analysis, Calculate percentage/ Eval	Mar 2010 & Mar 2012
Resources	What are the costs associated with implementing the Diabetes Prevention and Control Health Care Systems Intervention at the state? What are the costs associated with implementing the Health Care Systems Intervention at practice level?	Budget amount for the Healthcare Systems Intervention In kind contributions (including staff time)	Program budget Practice site telephone interviews	Quantitative analysis, itemize costs & contributions/ Eval & DPCP staff	Mar 2010 & Mar 2012 Mar 2010 & Mar 2012
Capacity building	To what extent have practice sites increased their capacity for identifying pre-diabetes and disease progression?	Description	Practice site telephone interviews	Qualitative analysis, extracting themes around capacity/ Eval	Mar 2010 & Mar 2012
Implementation					
Intervention description	What is the process for implementing the intervention at the state level? What is the process for implementing the intervention at the	Description (What was implemented and what worked).	Interviews with key MDPCP staff Practice site telephone	Qualitative analysis, describing steps of implementation/ Eval	Mar 2010 & Mar 2012

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APPENDIX D

Summary Evaluation Results Matrix

Question Type	Evaluation Question(s)	Indicator(s)	Results
Inputs			
Resources 1.0 (from logic model)	What are the costs associated with implementing the Health Care Systems Intervention at practice level and the health systems level?	In kind contributions (including staff time)	Funding for data extraction/reports from EMR essential.
Implementation			
Methods/ strategies 2.0	What elements are necessary to implement the intervention at the state, health care systems and primary care practice level?	Description	Leadership is necessary at every level to implement the pilot. Good relationships and communication between all partners is also necessary. Working with the Manager of Clinical Quality Improvement was helpful and essential as she knows the various practices and which ones may be most likely to be able to participate in a pilot. Finding a practice where there is an interest in diabetes prevention or there is a “champion” in the practice for prediabetes is crucial. Having top administrative support both at MaineGeneral Prevention Center and in the primary care practice is very important.
Facilitators/ obstacles 2.0	What facilitators and obstacles occurred while implementing the intervention at the state, health care system, and practice levels?	Description	<p>Not having good Electronic Medical Record data in the beginning of the pilot was a challenge. If data had been available to show the practice the current data on their population of patients – a prediabetes registry – this may have increased motivation. Initially the care manager was asked to collect the data on an excel spreadsheet and this was too burdensome and unrealistic for a busy practice.</p> <p>Leadership who speaks about this on a regular basis facilitates this process. Support from Manager of Clinical Quality Improvement/Clinical Support.</p> <p>Barrier is time. The state, health care system and practice are overwhelmed. Another barrier is physician and staff turnover. You think you are good to go and then staff turnover sets you back.</p>
Reach			
Provider participation 4.1	What percentage of staff is trained in the pilot?	Percentage of staff trained	3 out of 6 providers have been trained, but all providers and support staff have received some exposure to the pilot through staff meetings.
Effectiveness/ Efficacy			(See outcome evaluation in report.)