Section Q. Communications and Management Plan

Refer to DRR Section Q: Communications and Management Plan

Supporting Documentation Available:

Q1) Maine SIM Initiative website: www.maine.gov/sim
Q2) Communications Matrix

Maine SIM Communications Plan
Communications Matrix
(See Section Q – Communications and Management Plan)

Communications Targeted to All Groups

Initiative	6-13	7-13	8-13	9-13	10-13	11-13	12-13	1-14	2-14	3-14	4-14	5-14	6-14	7-14	8-14	9-14	10-14	11-14	12-14
				Develop				Launch					Maintain				Completed		
Distribute News Release - Public Forums																			
Host Regional Public Information Forums, including webinars																			
Create and maintain listserv for correspondence																			
Develop web portal for centralized communications																			
Schedule/Host Quarterly Web Forums																			
Create and distribute overarching quarterly update																			
Produce monthly e-mail update (one-sheet)																			
Develop Project Managers Report																			
Develop and implement web site enhancement *																			
Create plan for Cultivating Champions																			
Develop/implement public information/ relations strategy																			
Create SIM Overview Flier																			
Create SIM Overview Brochure																			
Launch Data Dashboard																			
Produce and Distribute Annual Report																			
Host Semi-Annual Meetings																			

*The web site is the lynchpin to communications efforts (see description of goals in the plan narrative).

Audience Specific Communications

Initiative	6-13	7-13	8-13	9-13	10-13	11-13	12-13	1-14	2-14	3-14	4-14	5-14	6-14	7-14	8-14	9-14	10-14	11-14	12-14
				Develop				Launch					Maintain				Completed		
Payment Reform work group update																			
Service Delivery Reform work group update																			
Transparency work group update																			
Progress overview - Legislature																			
SIM Success Stories - Media Pitch (Data/results)																			
Payer Forum																			
Service Delivery Forum																			
Patient Forum - Listening Sessions																			
Create Work Group Specific Fact Sheets																			
Distribute Data Reports to Targeted Audiences (timing TBD)																			

Section R. Evaluation Plan

Refer to DRR Section P: Evaluation

Supporting Documentation Available:

R1) PCMH Evaluation Progress Report – final

R2) AHRQ Multiple Chronic Conditions Project – final report

R3) Evaluation Workplan – Development & Implementation

Maine Patient-Centered Medical Home Pilot

Evaluation Progress Report

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June 2012

Acknowledgements

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Table of Contents

Executive Summary

This progress report summarizes the accomplishments, challenges, and baseline results of the Maine Patient-Centered Medical Home (PCMH) Pilot evaluation as of June 2012, and outlines the next steps for the evaluation. The Maine PCMH Pilot is a three-year, multi-payer statewide demonstration to implement patient- centered medical homes in 22 adult and 4 pediatric primary care practices in Maine.[1] The evaluation of the PCMH Pilot has multiple components, including:

1. An evaluation of the cost efficiency and quality outcomes of Pilot practices and non-Pilot, comparison practices, based on claims data
2. A survey of patient experience in the Pilot practices
3. A study of the implementation experience and impact in the participating Pilot practices, and
4. An analysis of practice-level clinical quality indicators in participating Pilot practices, based on medical record and electronic medical record (EMR) data.

The Maine PCMH Pilot began in January 2010. This evaluation will assess the implementation and impact of the PCMH Pilot over a 3-year period, 2010-2012 compared to a "baseline", pre-intervention year (2008). In this progress report, we provide an overview of the evaluation design and present and discuss baseline data for each of the components of the evaluation. The report also discusses the plan and timeline for completing additional analyses, upcoming patient experience and practice surveys, and anticipated challenges.

Status of Evaluation

Cost Efficiency and Quality Evaluation

In this component of the evaluation we are using Maine's all-payer claims data to measure the quality, utilization, and cost performance of the PCMH Pilot and comparison practices over three years: 2010-2012, relative to baseline. We used propensity score matching to select comparison practices whose performance we will compare with the primary care practices participating in the Maine PCMH Pilot. We selected two sets of comparison practices: (1) 22 primary care practices recognized as PCMH practices by the National Committee for Quality Assurance (NCQA) but which are not participating in the Maine PCMH Pilot, and (2) 44 primary care practices that are not NCQA recognized as PCMH practices and are not participating in the Maine PCMH Pilot.

To date, the evaluation team has received 2006-2010 data and has prepared analyses of performance in the "baseline" year, 2008, for the PCMH Pilot and comparison practices. Using PSM to select the comparison practices resulted in greater comparability among the Pilot and comparison practices in terms of the number of physicians, the practice type (FQHC, hospital-based, physician-based, etc.),

[1] Starting January 2013 the Pilot will expand the number of participating practices from 26 to 76. The added practices will join the multi-payer Pilot effective January 2013, and continue with the Pilot until the end of the Pilot (December 2014). This PCMH Pilot Evaluation however will be limited to the 26 original practices.

and urban/rural location. The analyses in this report describe the performance of the PCMH Pilot and comparison practices in the year prior to the Maine PCMH Pilot implementation. The following are highlights of the analysis of 2008 baseline data:

- **Service Use**: Five of 10 measures showed no significant differences between the Pilot and comparison practices. Differences were found on hospitalization measures and specialist visits.
- **Costs**: 10 of 13 measures showed no differences between Pilot and comparison groups. Primary care and hospitalization costs were the only outcomes that differed among the three groups.
- **Quality Indicators for Chronic and Preventive Care**: There are minimal differences between Pilot and comparison practices, with no consistent pattern of differences across the three groups.

Clinical Quality Measures

The adult PCMH Pilot practices have been reporting on a quarterly basis on a set of clinical quality measures based on data obtained through chart review or their EMR/registry systems. This evaluation report summarizes the baseline data for the Pilot practices for the last quarter of 2008.

- **Diabetes measures**: Pilot practices met or exceeded target goals for 10 of 14 diabetes measures with the exception of nephropathy screening, foot exams, eye exams, and smoking status assessed and treatment offered.
- **Cardiovascular measures**: Pilot practices met or were very close to meeting all cardiovascular quality measure target goals.
- **Prevention and behavioral health measures**: Pilot practices ranged between 43 to 58% on prevention and behavioral health measures. Target goals have not been set for these measures.

Patient Experience

A patient experience survey was administered in late 2009 in all PCMH Pilot practices. An analysis of the 22 adult Pilot practices showed similar results on composite measures compared to a national comparison. Patients reported a high level of trust and care by their provider, but areas such as attention to mental health issues and having follow-up contact were identified as areas for improvement.

Implementation Experience of PCMH Pilot Practices

By early in 2010 (Year 1) all Pilot practices had attained the minimum or higher levels of medical home functionality. As a group, the practices had made progress in 9 of the 10 Pilot core expectations, with HIT integration showing no change. Leadership and team work showed the highest level of achievement at the end of Year 1.

A survey focused on the environment in which PCMH Pilot practices were functioning and the stress level of staff members at midyear showed strength in teamwork, use of HIT, knowledge and use of community resources, adaptive reserve, and patient safety culture, all with scores at or above two-thirds of the maximum level possible. Scores measuring workload and stress showed strengths in

personal achievement and low levels of depersonalization. Levels of emotional exhaustion were in the moderate range, suggesting staff feelings of being over extended and exhausted by work.

On questions of how practices used the resources made available to them by the Pilot, most practices indicated they receive all or part of their PCMH funds directly for participating in the Pilot, with some reporting that the resources go to the Physician Hospital Organization (PHO); others were not aware of where the Pilot resources go. Practices use the funds for hiring new staff and reimbursing existing staff, purchasing new technology, such as an EMR or chronic disease management software system, conferences, operating expenses, and staff training. In-kind contributions from the practices include staff time and technology.

Practices reported that the learning sessions and data/feedback from the Pilot were the support resources that had the greatest impact.

Evaluation Challenges

Access to Data

There were significant delays in obtaining the all-payer claims data as a result of problems securing data use agreements. In addition, problems with MaineCare claims starting in September 2010 are raising complications with the Year 1 (2010) analysis.

Changes in Primary Care

The evaluation will be affected by changes in primary care practices, such as NCQA recognition, and changes attendant to Maine's participation in the Medicare Advanced Primary Care Practice demonstration.

Pharmacy Data

Pharmacy data will be limited to the MaineCare program as complete data are not available from all payers.

Timeline and Next Steps

- Comparison of baseline (2008) and Year One (2010): **Fall 2012**
- Comparison of baseline (2008) and Year Two (2011): **Spring 2013**
- Comparison of baseline (2008) and Year Three (2012): **Fall 2013 or Spring 2014 (depending on data availability)**
- Follow-up patient experience survey: **Fall 2012**
- Follow-up practice culture survey: **January 2013**

Maine Patient-Centered Medical Home Pilot Evaluation Progress Report

Purpose

This progress report provides an update for Patient-Centered Medical Home (PCMH) Pilot funders, conveners, evaluation subgroup members, and Pilot practices on the progress of the Maine PCMH Pilot evaluation. The Maine PCMH Pilot is a three-year multi-payer statewide demonstration that is implementing patient center medical homes in 26 primary care practices in Maine. The premise of the Pilot is that the resources provided to practices through the Pilot (including enhanced payments, training, consultation, and learning collaborative) will lead to "practice transformation" and a higher level of functionality as medical homes, which in turn will lead to improvements in the quality of care, cost efficiency, and patient/family satisfaction. The evaluation of the PCMH Pilot has multiple components, including:

1. An evaluation of the cost efficiency and quality outcomes of Pilot practices and non-Pilot, comparison practices, based on claims data
2. A survey of patient experience in the Pilot practices
3. A study of the implementation experience and impact in the participating Pilot practices, and
4. An analysis of practice-level clinical quality indicators in participating Pilot practices, based on medical record and electronic medical record (EMR) data.

In the remainder of this report, we provide an overview of the evaluation design and present and discuss baseline data for each of these components of the evaluation. The report also discusses the plan and timeline for completing additional analyses, upcoming patient experience and practice surveys, and anticipated challenges.

Overview of Evaluation Design

Cost Efficiency and Quality Evaluation Design

The cost efficiency and quality evaluation is using a pre-post intervention and matched comparison group design to compare the 22 adult PCMH Pilot practices with two comparison groups. The objectives of the evaluation are to assess the impact of the Pilot on the quality and cost efficiency of care provided by the participating Pilot practices to MaineCare and other patients relative to the care provided by matched sets of comparison practices, and to identify the characteristics of the Pilot practices related to greater improvements in quality and cost efficiency. Calendar year (CY) 2008 represents the baseline period for the evaluation. The intervention period is CYs 2010 – 2012. This analysis uses Maine all-payer claims data. This evaluation only includes the 22 adult practices since the 4 pediatric practices are included in another evaluation project.

Clinical Quality Monitoring

The Maine PCMH Pilot has collaborated with the New Hampshire PCMH Pilot to create a web-based system for collecting the clinical quality data and constructing these measures. Measures on diabetes, cardiovascular disease, prevention, behavioral health, and meaningful use are reported through a chart review of 25 records, from the practice's EMR system, or registry systems. Measures are reported quarterly for the fourth quarter of 2008 (baseline) through 2012.

Patient Experience Survey

Late in 2009, prior to the start of the Pilot, the PCMH Pilot conducted a patient experience survey in all of the participating Pilot practices using a modified version of the Consumer Assessment of Healthcare Providers and Systems, Clinician & Group (CAHPS-CG) survey. The objectives of the survey were to measure patient experience and satisfaction with Pilot practice sites (including parents' experience and satisfaction with their children's health care providers), identify opportunities for quality improvement in Pilot practices, and provide baseline information for monitoring performance of the Pilot practices over the three-year Pilot period. Although the Pilot had no specific plans or resources to conduct a follow up survey, a fall 2012 statewide patient experience survey to be conducted by the Dirigo Health Agency/Maine Quality Forum will provide some comparable, comparative data. Direct comparisons between the 2009 and 2012 surveys may not be possible due to differences in wording of questions.

Implementation Evaluation

The implementation evaluation was conducted in 2010, with plans to repeat the practice culture survey in January 2013. The first product of this component of the evaluation profiled the characteristics of the Pilot practices at baseline, described the practices' objectives and strategies for implementing the Pilot, and described the practices' experience in the implementation process.[2] The evaluation used existing data (e.g. Pilot application information) and practice surveys focusing on practice culture, resource use and other topics, and information from Pilot Learning Sessions.

Changes in Maine PCMH Pilot

Expansion of PCMH Pilot Practices

The Pilot was originally planned as a three-year demonstration (January 2010 to December 2012). With the Pilot's participation in the Multi-payer Advanced Primary Care Practice Demonstration (discussed below), the timeframe of the Pilot has been extended to December 2014. In addition, the Pilot will expand the number of participating practices from 26 to 76 (50 additional practices added). The added practices will join the multi-payer Pilot effective January 2013, and continue until the end

[2] The full report of the baseline implementation report is available at http://muskie.usm.maine.edu/Publications/Maine-PCMH-Implementation-Evaluation.pdf.

of the Pilot (December 2014). While the Pilot plans to expand in terms of timeframe and number of practices, available funding for the Maine PCMH Pilot evaluation will limit our focus to the original three-year Pilot with the 26 Pilot practices.

Multi-payer Advanced Primary Care Practice Demonstration (MAPCP)

Maine is one of eight states participating in the Center for Medicare and Medicaid Services' (CMS) Multi-payer Advanced Primary Care Practice Demonstration (MAPCP). The demonstration is evaluating the impact of PCMH practices on reducing use of services and expenditures, improving the safety, effectiveness, timeliness and efficiency of health care, increasing patient decision-making, and increasing service availability to underserved areas.[3] With Maine's participation in this demonstration, the Pilot has developed and implemented Community Care Teams (CCTs), one of the required components of CMS's MAPCP demonstration. The CCTs goals are to help patients connect and coordinate healthcare and community resources to improve health outcomes, achieve health improvement goals, and reduce avoidable costs. Maine has selected eight CCT providers.

CMS has contracted with the Research Triangle Institute (RTI) to evaluate the MAPCP demonstration. With Maine's participation in the demonstration, the evaluation team has been working to harmonize our evaluation approach with the national evaluation and to explore the feasibility of including Medicare data in the Maine-based evaluation of the Pilot.

MaineCare Health Homes Initiative

MaineCare, Maine's Medicaid program, is one of several funders supporting the Maine PCMH Pilot. In an effort to broaden its support of this model and promote value-based purchasing, MaineCare has developed the "Health Homes" initiative. This initiative defines a Health Home as a PCMH-recognized primary practice that works with a Community Care Team. Enhanced payments to Health Home practices are based on serving Medicaid beneficiaries with two chronic conditions; those with one chronic condition and at risk for a second condition; or adults with serious and persistent mental illness; or children with severe emotional disturbance. Health Home practices will be required to provide the following services: comprehensive care management; care coordination and health promotion; comprehensive transitional care from inpatient to other settings; individual and family support; referral to community and social support services; use of health information technology; prevention and treatment of mental illness and substance abuse disorders; and coordination of and access to preventive services, chronic disease management, and long-term care supports. Implementation of the Health Homes initiative will begin in August 2012 (phase one focus: members with chronic conditions), with phase two starting in January 2013 (members with severe and persistent mental illness or severe emotional disturbance). The expectation is that there will be overlap be-

[3]CMS. Multi-payer Advanced Primary Care Initiative. Available at: http://www.cms.gov/Medicare/Demonstration-Projects/DemoProjectsEvalRpts/Medicare-Demonstrations-Items/CMS1230016.html

tween practices participating in the Maine PCMH Pilot and the Health Homes initiative.

Status and Accomplishments of the Cost Efficiency and Quality Evaluation

Overview

Baseline evaluation reports on the patient experience and implementation components of the PCMH Evaluation have been completed.[4] In addition, the evaluation team has used Maine's all-payer claims data to create the analytic files needed for the cost efficiency and quality evaluation and conducted analyses of those files (which are reported here) describing the baseline (2008) performance. The following narrative describes the methods and results of the selection of the comparison practices followed by a presentation of baseline analyses of the cost efficiency and quality measures.

Comparison Practice Selection

The design of the cost efficiency and quality evaluation required us to select comparison practices. The evaluation's original approach was to have two comparison groups: (1) practices that applied for the Maine PCMH Pilot but were not selected, and (2) practices that would be considered "usual care". To better align our methods with the RTI evaluation of the Medicare demonstration, we have chosen instead to select two sets of comparison practices using propensity score matching (PSM)[5]:

Because of the possible differences between NCQA-recognized practices and other primary care practices that might influence outcomes and the practices' ability to improve them, we created two comparison groups:

1. **NCQA-recognized, not in Pilot**: Forty one adult practices were available as of October 2011. We selected 22 practices that were NCQA-recognized but not participating in the Pilot for this comparison group. Each Pilot practice was matched with the non-Pilot practice with the closest propensity score. Although they are NCQA-recognized, they do not receive the additional payments or coaching from the Pilot, but they may be able to receive assistance from their Physician-Hospital Organization, health system or other sources. These differences might affect the practices' baseline quality and efficiency and their ability to improve over time. By comparing the other NCQA-recognized practices with the Pilot practices, we aim to differentiate the impact of the Pilot intervention (extra payments and coaching) from other practice characteristics that are associated with NCQA recognition.

[4] The full report of the baseline implementation report is available at http://muskie.usm.maine.edu/Publications/Maine-PCMH-Implementation-Evaluation.pdf.

[5] Propensity score matching uses logistic regression to calculate a propensity score for each practice based on its characteristics. The score indicate how likely (the "odds") it is that a practice is in the Pilot group. For example, if Pilot practices are more likely to be larger in number of physicians and patient volume and to be in urban areas, the propensity score for Pilot practices will be higher (e.g., close to 1.00) and the propensity score for smaller rural practices will be low (close to 0.00). PSM was developed to use in studies when random assignment to the intervention is not possible and when characteristics of the experimental and comparison groups are or may be different. It can result in a comparison group that is more similar to the experimental group in practice characteristics than produced by systematic random selection.

2. **Not NCQA-recognized and not in Pilot**: A total of 270 adult care practices were available for selection into this group. Two practices for every one Pilot practice were selected, for a total of 44 practices. We created this group because the majority of primary care practices in Maine are not currently NCQA-recognized. Comparing them to the Pilot practices at baseline and at the end of the study period will enable us to evaluate the impact on quality, and cost efficiency of all factors that might be associated with the Pilot and with NCQA-recognition.

We used the number of physicians, the practice type (FQHC, hospital based, physician based, etc.), and urban/rural location in the matching process. We obtained information about the practices' NCQA status from NCQA. Prior to propensity score matching (PSM), there were significant differences on several practice characteristics between the Pilot practices and all potential comparison practices (Appendix B, Table B-1). Using PSM to select the comparison practices resulted in greater comparability among the Pilot and comparison practices in terms of the number of physicians, the practice type (FQHC, hospital based, physician based, etc.), and urban/rural location (Appendix B, Table B-2). Achieving comparability between practices at baseline is the desired effect of using PSM and enables us to better isolate the effects of the PCMH model and Pilot interventions on outcome measures.

Risk adjustment

To account for differences in patient severity of illness among the patients in the study populations, we risk-adjusted the utilization and cost measures. The risk adjustment system used is Adjusted Clinical Group® (ACG®), developed by the Johns Hopkins Bloomberg School of Hygiene and Public Health in Baltimore, MD. We used the ACG relative severity weights to compare patient severity in the Pilot practices and all the other primary care practices in the database. These "unscaled" weights are calculated by the developers so that 1.00 is the average weight for the national population used in ACG development.

After selecting the comparison group practices, we re-scaled the ACG weights so that 1.00 is the average weight for the patients in our study population ("scaled weights").

Utilization measures

We used generalized linear models on member-level data to estimate risk-adjusted utilization rates. The scaled ACG weight was the independent variable. The tables in the Appendix present the average unadjusted and estimated risk-adjusted utilization rates for each study group; observations were clustered by practice.

Cost measures

We estimated what each patient's costs would be if their risk were average (1.0). To accomplish this, we multiplied each patient's standardized cost by the inverse of the ACG weight. For example, if a patient had costs at $100 and a risk score of 2.0 (double the average), the estimated cost based on a

risk score of 1.0 would be $50. The tables in the Appendix present the average unadjusted and estimated risk-adjusted costs for the study groups; observations were clustered by practice.

Baseline Comparisons of Pilot and Comparison Group Practices on Claims-Based Cost Efficiency and Quality Measures

The following analyses show baseline data for CY 2008 before the Pilot started. The impact of the PCMH model will be evaluated when follow up claims data are available (planned for the Fall 2012). We compared the Pilot and comparison practices in terms of cost efficiency and quality measures. Separate tables show measures for MaineCare patients.[6] The following narrative highlights the baseline comparisons among the three practice groups.

Service Use

(Appendix B, Tables B-3, B-4)

- The Pilot differed from comparison groups for five of the 10 measures. Pilot practices had fewer specialist visits annually than the NCQA-recognized practices not in the Pilot. Pilot practices had more ambulatory care sensitive condition hospitalizations, readmissions, hospital admissions, and patient days than the practices which are NCQA-recognized and not in the Pilot. Pilot practices also had a higher rate of hospitalizations and hospital days than practices that were not NCQA-recognized and not in the Pilot.
- Analysis of MaineCare members showed no significant differences between Pilot and comparison groups on these measures.

Costs

(Appendix B, Tables B-5, B-6)

- Only one difference in cost performance was found between Pilot and comparison group practices: NCQA-recognized practices that were not in the Pilot had higher primary care costs (per member per month-PMPM), and lower hospital admissions for ambulatory care sensitive conditions, as well as lower total hospital admission costs than the Pilot. Practices that are not NCQA-recognized and not in the Pilot also had significantly lower hospital admission costs (PMPM) for ambulatory care sensitive conditions and total hospital admission costs (PMPM). There were no other significant differences between Pilot practices and comparison practices on PMPM health service costs.
- There were no significant differences on cost measures between Pilot practices and comparison groups for MaineCare patients.

Quality Indicators for Chronic and Preventive Care

(Appendix B, Tables B-7, B-8)

- There are minimal differences between Pilot and comparison practices on measures of chronic care and preventive care. The only differences at baseline were that NCQA- recognized practices not in the Pilot had higher screening rates for breast cancer, cervical cancer, and colorectal

[6] MaineCare is one of the conveners of the Maine PCMH Pilot and is a major funder of this evaluation.

cancer than the Pilot practices. The Pilot practices performed better on diabetes eye exams and less well on colorectal cancer screening than practices that are not NCQA-recognized and not in the Pilot.

- Analysis of chronic and preventive care measures for MaineCare patients showed similar results as those observed for all patients, with the exception of no differences in cervical and colorectal cancer screenings between the Pilot and practices that are NCQA recognized but not in the Pilot.

Baseline Comparisons of Clinical Quality Measures-Pilot Practices Only, Using Medical Record and EMR data

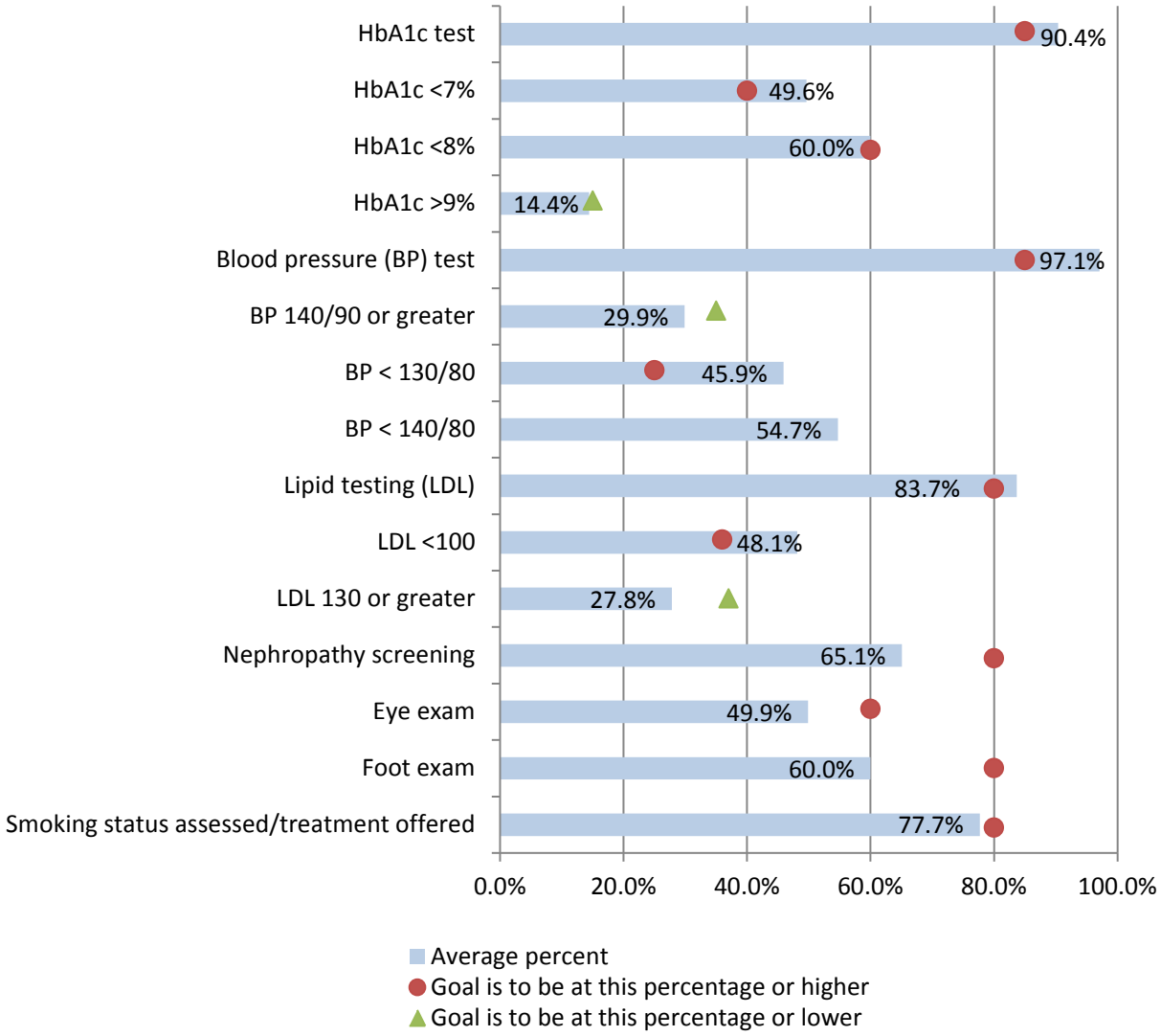
The adult-serving PCMH Pilot practices report quarterly on a set of 32 clinical quality measures. Measures highlighted here focus on patients with diabetes, cardiovascular disease, and measures on prevention and behavioral health. All but two practices have reported measures for the baseline period (fourth quarter of 2008). Some practices had difficulty reporting measures from their EMR systems; we have included all data submitted. All measures and baseline averages are in Appendix C.

Diabetes Measures

(Appendix C, Table C-1)

- Most measures met or exceeded Pilot target goals.
- In adult PCMH Pilot practices at baseline, over half of patients with diabetes had a recent HbA1c less than 8%, 50% had an HbA1c less than 7%, and 14% had an HbA1c greater than 9%.
- Almost all diabetic patients had blood pressures recorded in the past year (97%), with slightly more than half having a blood pressure below 140/80 (55%). Almost half of diabetic patients had a LDL less than 100 (48%), and 28% had a LDL of 130 mg/dl or greater.
- Over three-quarters of diabetic patients (78%) had documentation of smoking status, with cessation counseling or treatment within the past year if the patient was a smoker.

Figure 1. Diabetes Quality Measures, Fourth Quarter 2008

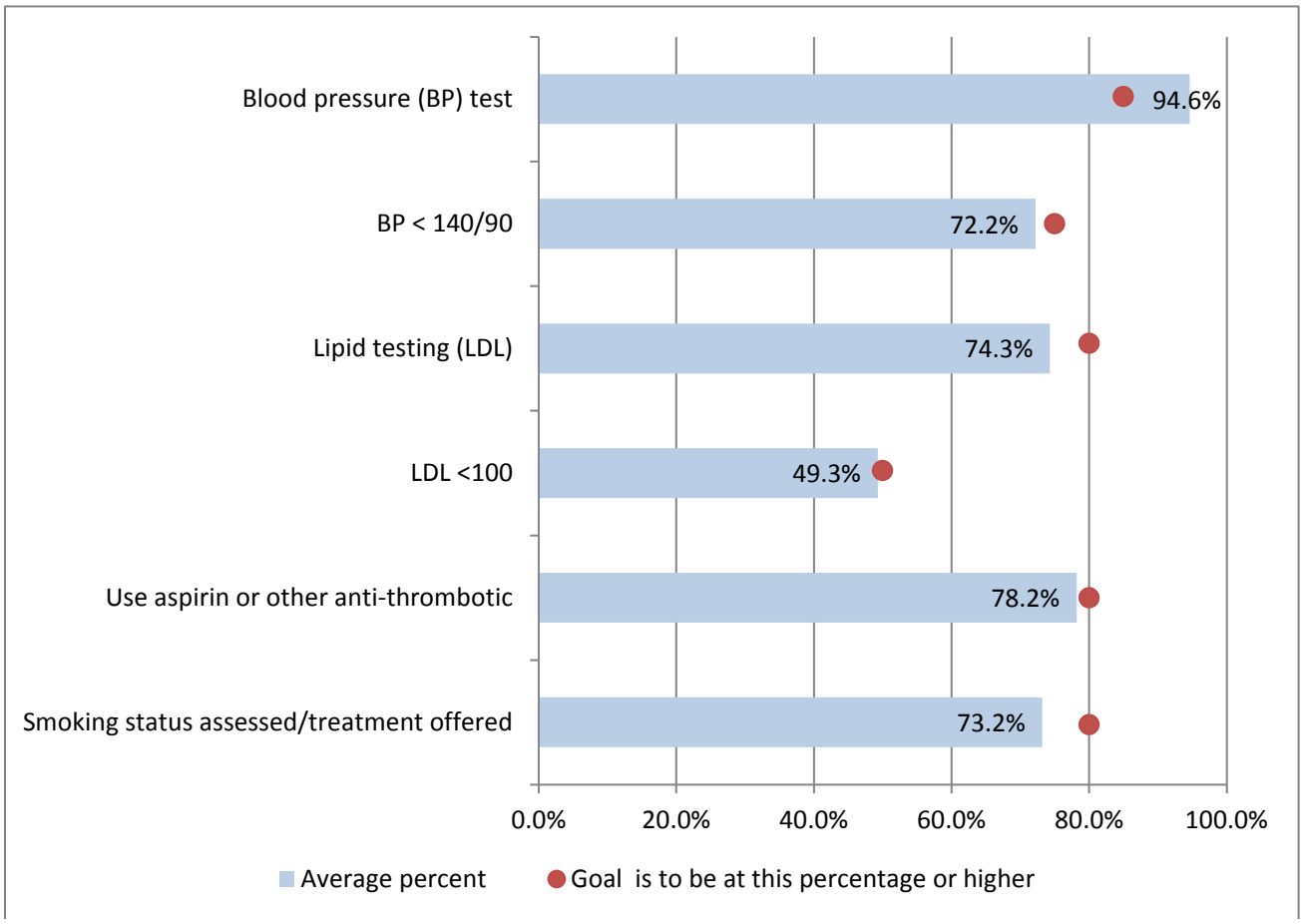


Cardiovascular Measures

(Appendix C, Table C-2)

- Almost all patients (95%) with cardiovascular disease had their blood pressure recorded in the past year, with most (72%) having a blood pressure less than 140/90 mg/dl.
- About half (49%) of patients with cardiovascular disease had their most recent LDL less than 100 mg/dl.
- Most cardiovascular patients (78%) were using aspirin or another antithrombotic within the past year if it was not contraindicated.
- Nearly three-quarters of cardiovascular patients (73%) had documentation of smoking status, with cessation counseling or treatment within the past year if the patient was a smoker.

Figure 2. Cardiovascular Disease Quality Measures, Fourth Quarter 2008

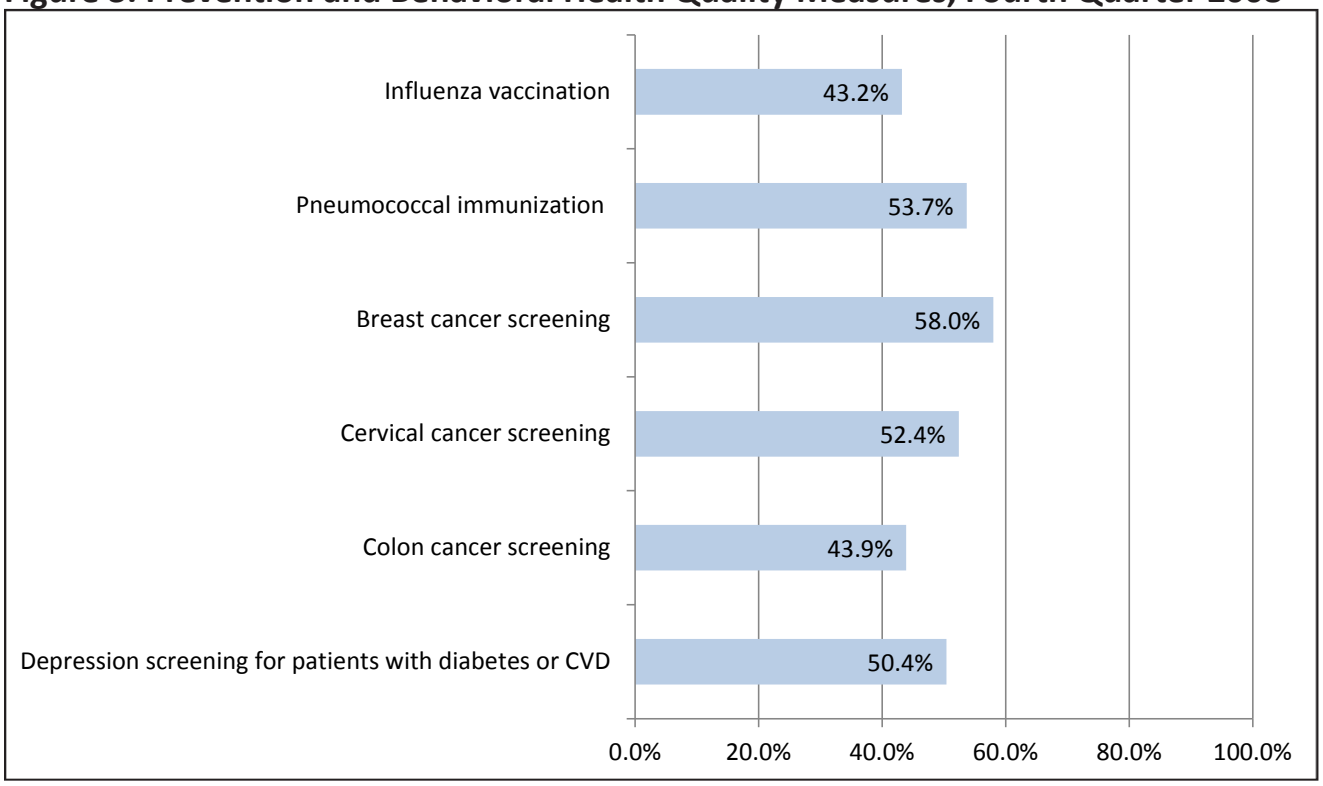


Prevention and Behavioral Health Measures

(Appendix C, Table C-3)

- About half of patients had their influenza vaccine (43%) and their pneumococcal immunization (54%).
- Just over half of women had a breast cancer screening (58%) and cervical cancer screening (52%).
- Under half of patients had a colon cancer screening (44%).
- Half of patient with diabetes or cardiovascular disease had a depression screening (50%).

Figure 3. Prevention and Behavioral Health Quality Measures, Fourth Quarter 2008



Survey of Patient Experience-Pilot Practices Only

In December 2009, Maine's PCMH Pilot sponsors required each Pilot practice (and related practice sites) to administer a patient experience survey. The survey consisted of 39 questions, taken primarily from the Consumer Assessment of Healthcare Providers and Systems, Clinician & Group (CAHPS-CG), a standardized survey of patients' experiences with physicians and their office staff.[7] The CAHPS-CG survey has several composite measures that use a combination of questions to address a particular component of patient satisfaction. In this analysis we use the composite measures from the CAHPS-CG survey to profile the Pilot practices and compare them with practices in a national sample (see below). Only adult practices (22 Pilot practices) were included in this analysis.

The CAHPS-CG survey has several composite measures that use a combination of questions to address a particular component of patient satisfaction. Each question has response options, such as "always", "usually", "sometimes", and "never". Responses to the survey were converted to a scale from 0 to 100, with 100 being the most favorable response. The measures were calculated using the average score for the questions in each composite. Maine's overall score on a measure is the average of the 22 practice scores. Measures were not adjusted for practice case-mix, and composite measures used equal weights for the number of questions in the composite. The national benchmark is from

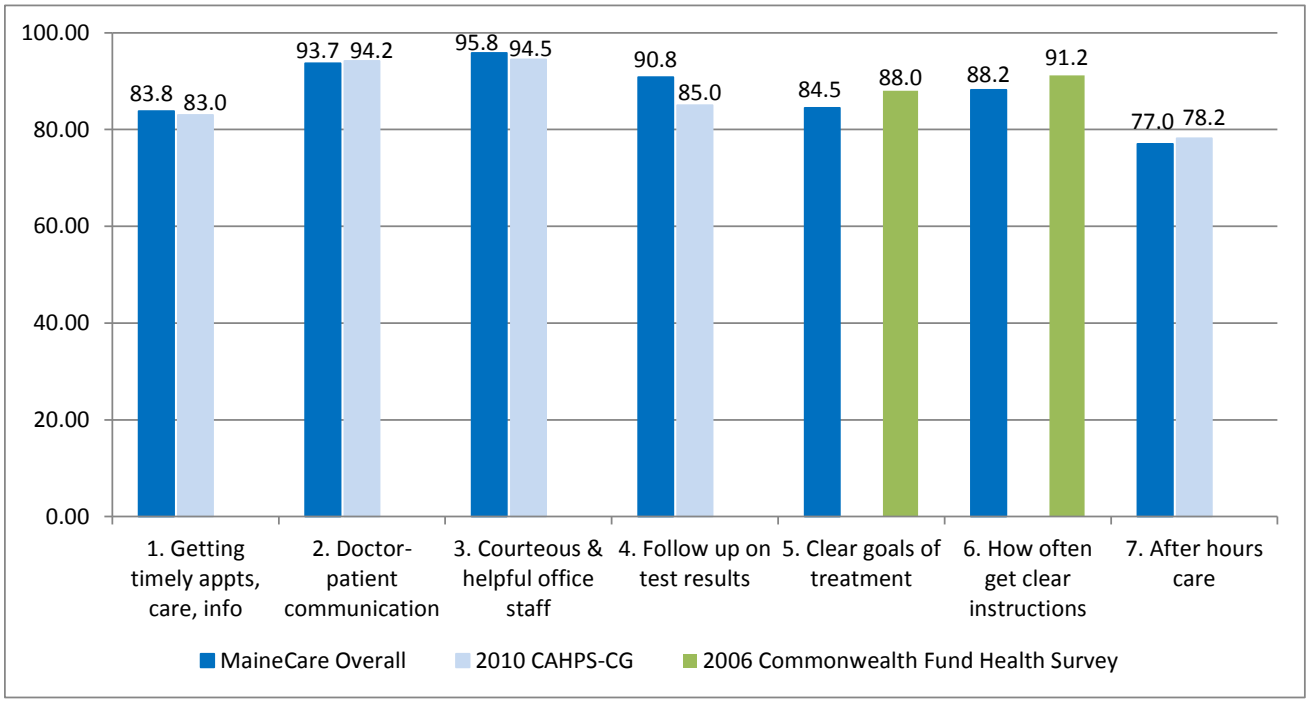
[7] AHRQ. Consumer Assessment of Healthcare Providers and Systems, Clinician & Group (CAHPS-CG), Available at: https://www.cahps.ahrq.gov/clinician_group/

the 2010 CAHPS-CG survey database and the 2006 Commonwealth Fund Health Quality Survey.[8] Due to wording differences between Maine's survey and the national surveys, only questions that are similar are used in the national comparison measures. In addition, there were several questions from the earlier CAHPS-CG survey for which there was no equivalent question in the national 2010 CAHPS-CG database.

As shown in Figure 4, seven measures/questions had a national comparison available. The Pilot practices had very similar scores on all seven to the national comparison, with six of the seven scoring over 80%.

As shown in Figure 5, patients also reported on average a high level of trust and care by their provider (98%). Other areas such as attention to mental health issues and having follow-up contact were identified as areas for improvement.

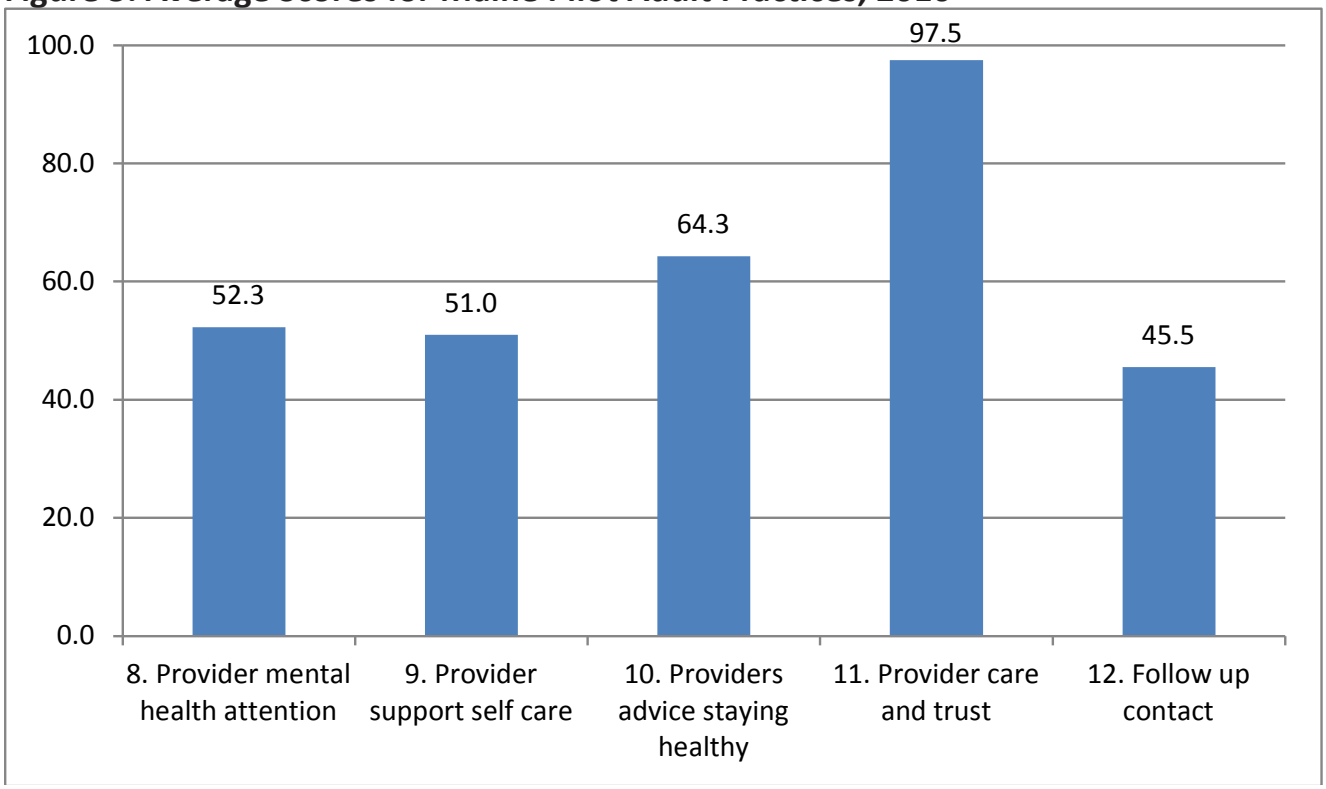
Figure 4. Average Scores for Maine Pilot Adult Practices and National Comparison Groups*



* National comparisons are averages based on all patient responses. Maine overall averages represent averages of the 22 practices.

[8] Commonwealth Fund 2006 Health Quality Survey. Available at: http://www.commonwealthfund.org/Surveys/2006/The-Commonwealth-Fund-2006--Health-Care-Quality-Survey.aspx

Figure 5. Average Scores for Maine Pilot Adult Practices, 2010*



* No benchmark results are available from 2010 CAHPS-CG survey database or 2006 Commonwealth Fund Health Quality Survey.

PCMH Implementation Analysis

The evaluation of the implementation of the PCMH Pilot in practices was conducted in April 2010 through March 2011. The following highlights findings from this evaluation, which used a mixed methods approach.[9] The results focus on the strategies that practices were using to transform their practices and the challenges they identified.

Core Expectations

Each practice in the Pilot committed to achieving 10 core expectations during the Pilot, phasing in more expectations over the three years. In the first year, the expectations most frequently selected as their focus areas were team-based approach to care, practice-based integrated care management, and enhanced access to care (each selected by 11 practices). Strategies to address these expectations included:

- **Teamwork**: Schedule regular all-practice staff meetings, develop role-specific teams, and define staff members' roles.
- **Integrated care**: Hire a care manager, train medical assistants to follow up with patients to improve compliance and assist providers with complex patients, and streamline access to internal and community resource.

[9] The full report of the baseline implementation report is available at http://muskie.usm.maine.edu/Publications/Maine-PCMH-Implementation-Evaluation.pdf.

- **Access**: Increase morning hours and same-day appointments; try to have patients see their primary care provider at acute and follow up visits, and calculate time to third to next available appointment.

Medicaid (MaineCare)

About a quarter of the practices (24%) anticipated challenges serving MaineCare members. They planned to address these challenges through multiple strategies, including:

- working collaboratively with assistance programs and MaineCare case managers,
- developing strategies to reduce the number of patients skipping appointments,
- using MaineCare's educational "referral form,"
- providing sliding scale options,
- increasing acute care access, and
- working with emergency departments to target frequent users and encourage use of the primary care setting.

Year 1 Implementation Progress

Practices' Progress in Accomplishing their Objectives

By early in 2010 (Year 1) all of the Pilot practices had attained the minimum or higher levels of medical home functionality. As a group, the practices had made progress in 9 of the 10 Pilot core expectations, with HIT integration showing no change. Leadership and team work showed the highest level of achievement at the end of Year 1.

Practice Culture and Workplace Stress at Midyear

These measures capture information on practices' "adaptive reserve" and other factors that can influence the degree to which they can transform themselves into medical homes. In August 2010, the responses showed strength in teamwork, use of HIT, knowledge and use of community resources, adaptive reserve, and patient safety culture, all with scores at or above two-thirds of the maximum level possible. Scores for work showed strengths in personal achievement and low levels of depersonalization. Levels of emotional exhaustion were in the moderate range, suggesting that practice staff have feelings of being over extended and exhausted by work.

The practice culture survey, which measures adaptive reserve and related factors, showed, on average, that Pilot practices have strengths in several domains, most notably teamwork. The stress survey showed strengths in personal achievement and (lack of) depersonalization. There were some differences among the practices in these measures. Six practices had significantly higher scores on two or three domains, suggesting that they can share useful information with the other practices on "how they did it." Three practices have relatively low levels on two or three domains, indicating that they may benefit from consultation or coaching. At midyear, the work place stress survey indicated moderate levels of emotional exhaustion.

Practices received their results from the practice culture and work place stress survey. The conveners reached out to the practices that had low scores on the culture/work place stress measures with extra resources and support to assist them in targeting interventions to address problems identified.

Physicians, nurse practitioners, and physician assistants tended to score higher than nursing/clinical and administrative staff on adaptive reserve and on teamwork, higher than nursing/clinical staff on patient safety culture; and higher than administrative staff on personal achievement.

Use of Pilot Resources by the Practices

Respondents from nine of 17 reporting practices said that their practices receive all or part of the funds directly for participating in the Pilot. Respondents from three practices said the payments go to the practice and the PHO, three said they go to the PHO, and two did not know where the funds go. They used the funds to hire new staff and reimburse existing staff, purchase new technology, such as an EMR or chronic disease management software system, attend conferences, cover operating expenses, and support staff training.

In-Kind Contributions from the Practices toward Pilot Objectives

The practices contributed in-kind resources, apart from those received from the conveners, to support the Pilot. The most frequently mentioned in-kind resources are staff time, followed by technology, care management, behavioral health care services, and staff training on integrating care management. Some of the practices' physician affiliated with PHOs received support in the form of increased staff time, new staff, or quality coaches to support the Pilot.

Impact of the Pilot Activities on their PCMH Work

Many focus group participants reported positive changes and benefits from participating in the Pilot, especially related to teamwork and communication. They also noted challenges related to limitations of time, staff, and financial resources and the need to continue to provide care while implementing the Pilot and other initiatives. The focus groups and the practice culture survey suggest that the Pilot affects staff members differently depending on their roles. There is some evidence that the burden of change falls more on clinical staff and administrators, as they are the ones taking on new tasks and responsibilities, than on physicians.

Respondents felt that the support resources that had the greatest impact were the learning sessions and the data and feedback from the Pilot. About half said that the coaching and monthly conference calls had an impact.

Evaluation Challenges

Data Access and Quality

The cost efficiency and quality component of this evaluation of the PCMH Pilot is based on administrative claims data obtained from Maine's all-payer claims database. Data were provided to the evaluation team by Health Dialog which, at the time, was under contract with the Maine Quality Forum (MQF) and the PCMH Pilot to develop practice level quality performance reports using the all-payer claims data.

Work on the evaluation was significantly delayed by at least six months by unexpected delays in obtaining University of Maine System approval of a data use agreement with the Maine Health Data Organization. In addition, the evaluation has been affected by problems discovered in late 2011 with the MaineCare data in the all-payer claims database. The MaineCare claims problems affect the evaluation team's analyses of the 2010-12 all-payer claims data, the intervention years in the PCMH Pilot. The PCMH Pilot's evaluation sub-group agreed that we should delay analysis of the 2010/Year 1 data until mid-year (July 2012) in the hopes that the MaineCare problems are resolved. We have recently (July 2012) learned that the MaineCare data submitted to the MHDO contains problems with both eligibility information and with hospital and other claims that appear to be missing and/or inaccurate. After considerable effort to diagnose the source of the problem, the evaluation team is now working with staff from the Muskie School to obtain MaineCare claims data directly from the claims warehouse, bypassing the MHDO all-payer claims files.

The evaluation team has also been delayed by discussions between the MQF and Health Dialog regarding the encrypted identifiers in the files that Health Dialog has provided to the evaluation team. These identifiers are needed to link, in an unidentified manner, claims for individuals in 2008 and 2009 with their claims in 2010. These identifiers are essential to the team's ability to analyze the 2010/Year 1 all-payer claims data. This issue has just been resolved (late August 2012).

The data submitted by practices from their EMR for the clinical quality measures was challenging for some practices. We have included all data submitted, but acknowledge the potential issue with data reporting.

And finally, the evaluation will be limited by the fact complete pharmacy data are not available from all payers, so analysis of pharmacy data is limited to the MaineCare population.

Effects of Changes in Practice Environment on Evaluation Design

There are methodological challenges in conducting this evaluation over a three year time frame. Specifically, there are difficulties in tracking changes in Pilot practices (e.g. loss of a provider) that affect how patients are attributed to the practice. Maine's participation in the MAPCP demonstration, and

the addition of Community Care Teams in the demonstration represent additional "disruptions" in the practice environment that may affect the performance of both Pilot and comparison group practices. In addition, primary care practices throughout the state are becoming NCQA-recognized PCMH practices, including comparison practices selected for this evaluation. And finally, the implementation of MaineCare's Health Homes initiative may have unknown consequences for the evaluation.

Comparison Group Selection

As mentioned above, the original selection of comparison group practices was based on whether they had applied for the Pilot and were not selected, or if they were considered usual care. Changing the method for selecting the comparison practices to propensity score matching (PSM) meant that data had to be re-run, which slowed down some of the analysis. Regardless, the effort to use PSM proved to be beneficial, as the Pilot and comparison practices are more similar in terms of practice characteristics at baseline.

Timeline and Next Steps

Practice Culture Survey Administration

In September 2010, Pilot practice staff completed a practice culture survey as a part of the Implementation evaluation. The survey addressed areas such as adaptive reserve, teamwork, and knowledge of community resources. In January 2013, there are plans to repeat this survey. An analysis of changes since 2010 will be assessed.

Patient Experience Survey Administration

In 2010, Pilot practices administered a patient experience survey to their patients. The survey was derived primarily from the CAHPS instrument. In the fall of 2012, there are plans to administer a similar patient experience survey statewide. This survey will use the CAHPS PCMH instrument. This instrument has similar questions to the 2010 version, but direct comparisons between years may not be possible.

Comparison of Baseline (2008) to Year One (2010)

In the fall of 2012, the evaluation will assess the first-year impact of the Pilot, comparing the cost efficiency and quality performance of the Pilot practices. Analyses will examine whether the Pilot practices have improved their performance since baseline (2008) and will compare their performance against that of practices in our comparison groups. This timeframe for completion is subject to change, depending on data availability (see below).

Potential Issue of MaineCare 2010 Data

We are projected to receive the 2010 and 2011 MaineCare data mid-October which will delay MaineCare analysis until the first quarter of CY 2013.

Appendices

A – Evaluation Objectives, Study Design, and Timeframes

B – Cost Efficiency and Quality Evaluation, Baseline Results

C – Clinical Quality Data

D – Operational Definitions for Clinical Quality Measures

Appendix A – Evaluation Objectives, Study Designs, and Timeframes

PCMH Evaluation Component and Timeframe	Objectives	Study Design
Patient Experience 2009	1. Measure patient experience and satisfaction with Pilot practice sites 2. Measure parents' experience and satisfaction with their children's health care providers 3. Identify opportunities for quality improvement in Pilot practices 4. Serve as baseline information for monitoring performance of the Pilot practices over the three-year Pilot period.	Quantitative data analysis using a patient experience survey
Implementation April 1, 2010 - March 31, 2011	1. Profile the characteristics of the Pilot practices at baseline 2. Describe the practices' objectives and strategies for implementing the Pilot 3. Describe implementation during Year 1 4. Provide practical guidance to the practices, the Pilot conveners, and MaineCare 5. Develop profiles of the Pilot practices for use in the quality and efficiency evaluation 6. Develop recommendations for use by evaluators of other PCMH Pilots	Mixed methods study combining qualitative and quantitative data. Data sources include existing databases, Pilot application information, surveys (i.e. focused on practice culture, resource use), and information from Pilot Learning Sessions
Cost efficiency and quality 2010-2013	1. To evaluate the impact of the Pilot on the quality and cost and efficiency of care provided by the participating Pilot practices to MaineCare and other patients relative to the care provided by comparison practices. 2. To identify the characteristics of the Pilot practices related to greater improvements in quality and cost and efficiency	Pre-post intervention and *matched* comparison group design: comparison of 22 adult PCMH Pilot practices with two comparison groups. Baseline period is calendar year (CY) 2008; intervention period is CYs 2010 – 2012. Data sources include all-payer database and data on quality measures reported by practices.

Appendix B – Cost Efficiency and Quality Evaluation, Baseline Results

Table B-1. Comparison of Maine PCMH Pilot practices with all other eligible[1] primary care practices, before propensity score matching, 2008 baseline

Measure		NCQA recognition status[2]	
Categorical variables	**Pilot (n=22)**	**NCQA recognized – not in Pilot (n=41)**	**Not NCQA recognized – not in Pilot (n=270)**
Number of physicians			
1 to 2	4 (18.2%)	20 (48.8%)	167 (61.9%)**[3]
3 to 5	9 (40.9%)	10 (24.4%)	84 (31.1%)**
6 or more	9 (40.9%)	11 (26.8%)	18 (6.7%)**
Total number of providers			
1 to 2	1 (4.6%)	16 (39.0%)*	115 (42.6%)[5]**
3 to 5	7 (31.8%)	10 (24.4%)*	98 (36.3%)**
6 or more	14 (63.6%)	15 (36.6%)*	57 (21.1%)**
Practice type			
Federally qualified health center	4 (18.2%)	9 (22.0%)	41 (15.2%)*
Hospital based	8 (36.4%)	16 (39.0%)	62 (23.0%)*
Physician based	5 (22.7%)	12 (29.3%)	142 (52.6%)*
Rural health clinic	5 (22.7%)	4 (9.8%)	25 (9.2%)*
Location			
Urban core/suburban	10 (45.5%)	28 (68.3%)	102 (37.8%)
Large town	5 (22.7%)	9 (22.0%)	44 (16.3%)
Small town and rural	7 (31.8%)	4 (9.8%)	124 (45.9%)
Primary care only or multispecialty			
Primary care only	18 (81.8%)	36 (87.8%)	248 (91.9%)
Multispecialty	4 (18.2%)	5 (12.2%)	22 (8.2%)
Continuous variables			
Number of physicians	5.2	4.1	2.5**
Total providers	7.6	5.1	3.6**
PCP providers	7.5	5.0	3.4**
Average number of patients per site[4]	2,041	1,932	1,027**
Percent MaineCare	32.1	30.0	34.3
Average age[4]	46.3	46.3	48.1
Percent female[4]	58.5	59.1	58.2
Patient risk – average ACG unscaled weight[4,5]	0.99	1.09	1.08*

[1]Eligible practices for comparison group include practices with 30 or more patients attributed to their practice.

[2]NCQA status as of October 2011 was used to classify the practices into the study groups.

[3]There was one non-recognized practice in the with only a non-physician provider.

[4]Adult patients ages 18 and older.

[5] The Adjusted Clinical Group ® (ACG ®) was used for risk adjustment. The average unscaled weight was calculated by the ACG developers based on national data.

*Comparison group is significantly different than Pilot (p<.05) by chi-square or t-test.

**Comparison group is significantly different than Pilot (p<.01) by chi-square or t-test.

Table B-2. Comparison of Maine PCMH Pilot practices and primary care practices selected for comparison group practices, after propensity score matching, 2008 baseline

Categorical variables	Pilot (n=22)	NCQA recognition status[1]	
		NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
Total number of physicians			
1 to 2	4 (18.2%)	3 (13.6%)	9 (20.5%)
3 to 5	9 (40.9%)	10 (45.5%)	18 (40.9%)
6 or more	9 (40.9%)	9 (40.9%)	17 (38.6%)
Total number of providers			
1 to 2	1 (4.6%)	3 (13.6%)	4 (9.1%)
3 to 5	7 (31.8%)	7 (31.8%)	16 (36.4%)
6 or more	14 (63.6%)	12 (54.6%)	24 (54.6%)
Practice type			
Federally qualified health center	4 (18.2%)	2 (9.1%)	7 (15.9%)
Hospital based	8 (36.4%)	9 (40.9%)	13 (29.6%)
Physician based	5 (22.7%)	7 (31.8%)	18 (40.9%)
Rural health clinic	5 (22.7%)	4 (18.2%)	6 (13.6%)
Location			
Urban core/suburban	10 (45.5%)	13 (59.1%)	13 (29.6%)
Large town	5 (22.7%)	5 (22.7%)	12 (27.3%)
Small town and rural	7 (31.8%)	4 (18.2%)	19 (43.2%)
Primary care only or multispecialty			
Primary care only	18 (81.8%)	20 (90.9%)	38 (86.4%)
Multispecialty	4 (18.2%)	2 (9.1%)	6 (13.6%)
Continuous variables			
Number of physicians	5.2	5.9	5.0
Total providers	7.6	7.3	6.8
PCP providers	7.5	7.1	6.5
Average number of patients per site [2,3]	2,041	2,690	1,917
Percent MaineCare	32.1	27.4	32.1
Average age[2]	46.3	45.1	47.7
Percent females[2]	58.5	60.2	58.3
Patient risk – average ACG weight[2,3]	0.99	0.96	1.02

[1] NCQA status as of October 2011 was used to classify the practices into the study groups.

[2] Adult patients ages 18 and older.

[3] The Adjusted Clinical Group ® (ACG ®) was used for risk adjustment. The average ACG weight was scaled (calibrated) to the evaluation study population.

*Comparison group is significantly different than Pilot (p<.05) by chi-square or t-test.

**Comparison group is significantly different than Pilot (p<.01) by chi-square or t-test.

Table B-3. Comparison of service use for Maine PCMH Pilot and comparison practices, 2008 baseline

Measure – Service use		NCQA recognition status [1]	
	Pilot (n=22)	NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
	risk-adjusted[2] (unadjusted)	risk-adjusted[2] (unadjusted)	risk-adjusted[2] (unadjusted)
Primary care			
Total primary care visits annualized	1.91(2.21)	3.01(3.40)	2.66(3.01)
Specialty care			
Specialist visits annualized	0.94(1.33)	1.18(1.61)	1.16(1.58)
Emergency room			
Preventable[3] ED visits annualized	0.03(0.04)	0.04(0.04)	0.04(0.05)
ED visits that are primary care treatable[4] annualized	0.14(0.15)	0.15(0.16)	0.16(0.18)
ED frequent user[5] rate	5.1(5.9)	5.2(6.0)	6.2(7.1)
Total ED visits annualized	0.63(0.73)	0.68 (0.80)	0.75 (0.89)
Hospital			
ACS[6] hospital admission rate (per 1,000 member months)	0.20 (0.48)	0.18 (0.35)	0.22 (0.42)
Total hospital readmission rate within 30 days7 (per 1,000 member months)	0.13 (0.38)	0.09 (0.26)	0.14 (0.36)
Total hospital admissions (per 1,000 member months)	9.11(14.55)	9.92 (16.34)	8.07(12.66)
Total hospital patient days (per 1,000 member months)	13.14(62.81)	14.62(71.41)	11.97(61.44)

[1] NCQA status as of October 2011 was used to classify the practices into the study groups.

[2] The Adjusted Clinical Group ® (ACG ®) was used for risk adjustment. The risk-adjusted utilization rate for each study group is the rate for a patient with a risk weight of 1.00 (an "average" patient).

[3] Defined by NYU ED classification algorithm, preventable ED visits are visits where emergency department care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable if timely and effective ambulatory care was received during the episode of illness.

[4] Defined by NYU ED classification algorithm, primary care treatable visits are visits where treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting.

[5] ED frequent user is a patient with 4 or more visits in a year.

[6] ACS = ambulatory care sensitive, using AHRQ ACS algorithm.

[7] Defined by 3M Potentially Preventable Readmission grouping software

[*] Comparison group differs significantly different from Pilot ($p<.05$) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

[**] Comparison group differs significantly from Pilot ($p<.01$) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

Table B-4. Comparison of service use for MaineCare patients in Maine PCMH Pilot and comparison practices, 2008 baseline

Measure – Service use		NCQA recognition status [1]	
	Pilot (n=22)	NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
	risk-adjusted[2] (unadjusted)	risk-adjusted[2] (unadjusted)	risk-adjusted[2] (unadjusted)
Primary care			
Total primary care visits annualized	1.91(2.21)	3.01(3.40)	2.66(3.01)
Specialty care			
Specialist visits annualized	0.94(1.33)	1.18(1.61)	1.16(1.58)
Emergency room			
Preventable[3] ED visits annualized	0.03(0.04)	0.04(0.04)	0.04(0.05)
ED visits that are primary care treatable[4] annualized	0.14(0.15)	0.15(0.16)	0.16(0.18)
ED frequent user[5] rate	5.1(5.9)	5.2(6.0)	6.2(7.1)
Total ED visits annualized	0.63(0.73)	0.68 (0.80)	0.75 (0.89)
Hospital			
ACS[6] hospital admission rate (per 1,000 member months)	0.20 (0.48)	0.18 (0.35)	0.22 (0.42)
Total hospital readmission rate within 30 days[7] (per 1,000 member months)	0.13 (0.38)	0.09 (0.26)	0.14 (0.36)
Total hospital admissions (per 1,000 member months)	9.11(14.55)	9.92 (16.34)	8.07(12.66)
Total hospital patient days (per 1,000 member months)	13.14(62.81)	14.62(71.41)	11.97(61.44)

[1]NCQA status as of October 2011 was used to classify the practices into the study groups.

[2]The Adjusted Clinical Group ® (ACG ®) was used for risk adjustment. The risk-adjusted utilization rate for each study group is the rate for a patient with a risk weight of 1.00 (an "average" patient).

[3]Defined by NYU ED classification algorithm, preventable ED visits are visits where emergency department care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable if timely and effective ambulatory care was received during the episode of illness.

[4]Defined by NYU ED classification algorithm, primary care treatable visits are visits where treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting.

[5]ED frequent user is a patient with 4 or more visits in a year.

[6]ACS = ambulatory care sensitive, using AHRQ ACS algorithm.

[7]Defined by 3M Potentially Preventable Readmission grouping software

*Comparison group differs significantly different from Pilot (p<.05) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

**Comparison group differs significantly from Pilot (p<.01) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

Table B-5. Comparison of service use for MaineCare patients in Maine PCMH Pilot and comparison practices, 2008 baseline[1]

Measure – Costs[2]	Pilot (n=22)	NCQA recognition status[2]	
		NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
	risk-adjusted[3] (unadjusted)	risk-adjusted[3] (unadjusted)	risk-adjusted[3] (unadjusted)
Primary care			
Total primary care costs per member per month (PMPM)	$36.72 ($19.46)	$43.76* ($21.83)	$40.48 ($20.14)
Specialty care			
Specialist costs PMPM	$12.46 ($11.02)	$14.06 ($11.99)	$13.29 ($11.51)
Emergency room			
Preventable[4] ED visit costs	$0.88 ($0.73)	$0.71 ($0.56)	$0.87 ($0.70)
ER visits that are primary care treatable[5]	$3.71 ($2.93)	$3.18 ($2.35)	$3.72 ($2.83)
Total ED costs PMPM	$16.29 ($12.44)	$13.90 ($10.21)	$16.43 ($12.25)
Hospital			
ACS[6] hospital admission costs	$1.92 ($4.24)	$0.92** ($2.61*)	$1.12** ($3.11)
Total hospital readmissions within 30 days PMPM	$0.82 ($3.53)	$0.64 ($2.36)	$0.57 ($2.48)
Total hospital admissions costs PMPM	$25.37 ($61.20)	$14.96**($37.01**)	$11.17** (31.19**)
Imaging			
Advanced (high cost) imaging PMPM	$19.38 ($12.95)	$16.79 ($10.81*)	$20.68 ($13.26)
Total imaging costs PMPM	$47.59 ($41.01)	$42.12 ($35.42)	$51.56 ($42.79)
Procedures and surgeries			
Total procedures and surgeries costs PMPM	$81.47 ($87.69)	$90.80 ($92.34)	$88.24 ($92.13)
Other			
Laboratory tests costs PMPM	$50.02 ($38.45)	$47.86 ($34.27)	$59.68 ($41.83)
Total			
Total costs[7] PMPM	$430.11 ($403.19)	$396.11 ($355.45)	$418.09 ($382.02)

[1] Costs are standardized and capped at 99th percentile.

[2] NCQA status as of October 2011 was used to classify the practices into the study groups

[3] The Adjusted Clinical Group ® (ACG ®) was used for risk adjustment. The risk-adjusted cost for each study group is the cost for a patient with a risk weight of 1.00 (an "average" patient).

[4] Defined by NYU ED classification algorithm, preventable ED visits are for visits where emergency department care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable if timely and effective ambulatory care was received during the episode of illness.

[5] Defined by NYU ED classification algorithm, primary care treatable visits are for visits where treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting.

[6] ACS = ambulatory care sensitive, using AHRQ ACS algorithm.

[7] Total costs do not include pharmacy costs.

* Comparison group differs significantly different from Pilot (p<.05) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level. **Comparison group differs significantly from Pilot (p<.01) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

Table B-6. Comparison of standardized costs for MaineCare patients in PCMH Pilot and comparison practices, 2008 baseline[1]

Measure – Costs[2]	Pilot (n=22)	NCQA recognition status[2]	
		NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
	risk-adjusted[3] (unadjusted)	risk-adjusted[3] (unadjusted)	risk-adjusted[3] (unadjusted)
Primary care			
Total primary care costs per member per month (PMPM)	$27.63 ($18.38)	$42.29 ($26.11)	$35.94 ($21.96)
Specialty care			
Specialist costs PMPM	$12.39 ($12.50)	$15.54 ($14.85)	$14.22 ($14.19)
Emergency room			
Preventable[4] ED visit costs PMPM	$2.52 ($2.00)	$2.54 ($2.12)	$2.40 ($1.94)
ER visits that are primary care treatable[5] PMPM	$9.85 ($7.56)	$10.95 ($8.11)	$9.72 ($7.40)
Total ED costs PMPM	$27.19 ($22.02)	$29.58 ($23.39)	$29.50 ($23.31)
Hospital			
ACS[6] hospital admission costs PMPM	$1.22 ($3.42)	$0.66 ($2.95)	$0.61 ($2.56)
Total hospital readmissions within 30 days PMPM	$1.37 ($4.84)	$0.54 ($3.00)	$0.86 ($4.08)
Total hospital admissions costs PMPM	$44.02 ($127.15)	$51.05 ($137.32)	$47.86 ($121.53)
Imaging			
Advanced (high cost) imaging PMPM	$16.29 ($12.95)	$17.51 ($13.58)	$19.54 ($14.69)
Total imaging costs PMPM	$52.57 ($53.55)	$56.55 ($56.06)	$63.47 ($59.02)
Procedures and surgeries			
Total procedures and surgeries costs PMPM	$67.99 ($90.29)	$82.21 ($102.83)	$70.11 ($92.31)
Pharmacy			
Total pharmacy costs PMPM	$556.15 ($189.97)	$602.21 ($193.22)	$716.69 ($195.80)
Generic pharmacy costs PMPM	$465.49 ($155.03)	$501.98 ($157.17)	$547.41 ($159.25)
Other			
Laboratory tests costs PMPM	$53.72 ($48.36)	$59.34 ($52.41)	$59.87 ($50.40)
Total			
Total costs[7] PMPM	$548.34 ($543.29)	$581.54 (566.33)	$549.34 (557.68)

[1] Costs are standardized and capped at 99th percentile.

[2] NCQA status as of October 2011 was used to classify the practices into the study groups

[3] The Adjusted Clinical Group ® (ACG ®) was used for risk adjustment. The risk-adjusted cost for each study group is the cost for a patient with a risk weight of 1.00 (an "average" patient).

[4] Defined by NYU ED classification algorithm, preventable ED visits are for visits where emergency department care was required based on the complaint or procedures performed/resources used, but the emergent nature of the condition was potentially preventable if timely and effective ambulatory care was received during the episode of illness.

[5] Defined by NYU ED classification algorithm, primary care treatable visits are for visits where treatment was required within 12 hours, but care could have been provided effectively and safely in a primary care setting.

[6] ACS = ambulatory care sensitive, using AHRQ ACS algorithm.

[7] Total costs do not include pharmacy costs.

* Comparison group differs significantly different from Pilot (p<.05) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

** Comparison group differs significantly from Pilot (p<.01) based on negative binomial and Poisson regression models using generalized estimated equations, adjusted for clustering at the practice level.

Table B-7. Comparison of quality indicators for Maine PCMH Pilot and comparison practices, 2008 baseline

Measure[1]	Pilot (n=22)	NCQA recognition status[2]	
		NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
Chronic care			
Diabetes – HbA1c testing	70.8%	75.4%	67.9%
Diabetes - LDL-C screening	64.5%	69.4%	60.6%
Diabetes - medical attention for nephropathy	75.2%	76.0%	73.5%
Diabetes - eye exam	56.1%	57.8%	51.8%*
Cardio vascular disease - lipid test	78.9%	76.2%	77.1%
Preventive care			
Breast cancer screening	79.1%	84.0%*	80.7%
Cervical cancer screening	74.1%	79.4%*	75.1%
Colorectal cancer screening	38.1%	42.1%*	44.4%**

[1] Measures based on HEDIS® definitions.

[2] NCQA status as of October 2011 was used to classify the practices into the study groups

* Comparison group is significantly different than Pilot (p<.05)based on chi-square and t-test.

** Comparison group is significantly different than Pilot (p<.01)based on chi-square and t-test.

Table B-8. Comparison of quality indicators for MaineCare patients in Maine PCMH Pilot and comparison practices, 2008 baseline

Measure[1]	Pilot (n=22)	NCQA recognition status[2]	
		NCQA recognized – not in Pilot (n=22)	Not NCQA recognized – not in Pilot (n=44)
Chronic care			
Diabetes – HbA1c testing	53.7%	57.6%	51.4%
Diabetes - LDL-C screening	48.2%	50.9%	45.2%
Diabetes - medical attention for nephropathy	69.9%	70.1%	70.9%
Diabetes - eye exam	54.3%	53.5%	48.4%**
Cardio vascular disease - lipid test	79.6%	70.0%	74.6%
Preventive care			
Breast cancer screening	62.0%	66.8%*	64.7%
Cervical cancer screening	66.0%	68.5%	65.7%
Colorectal cancer screening	25.1%	28.5%	31.3%**

[1] Measures based on HEDIS® definitions.

[2] NCQA status as of October 2011 was used to classify the practices into the study groups

* Comparison group is significantly different than Pilot (p<.05)based on chi-square and t-test.

** Comparison group is significantly different than Pilot (p<.01)based on chi-square and t-test.

Appendix C – Clinical Quality Data

Table C-1. Clinical quality measures at baseline, chronic care diabetes measures, PCMH Pilot adult practices (n=20)*

Measure	Definition	# of practices reporting	Average percent (confidence interval)	Range	Target
Chronic Care - Diabetes					
Diabetes –Glucose control	Percentage of patients with diabetes with at least one HbA1c test within previous 12 months	20	90.4 (86.0-94.8)	75.6-100.0	>=85%
	Percentage of patients with diabetes with most recent HbA1c level less than 7%	20	49.6 (44.8-54.5)	35.1-72.0	>=40%
	Percentage of patients with diabetes with most recent HbA1c less than 8%	19	60.0 (48.5-71.5)	12.0-96.0	>=60%
	Percentage of patients with diabetes with most recent HbA1C greater than 9%	20	14.4 (9.6-19.2)	4.0-36.9	<=15%
Diabetes –Blood pressure control	Percentage of patients with diabetes with BP recorded within previous 12 months	19	97.1 (95.2-99.0)	86.8-100.0	>=85%
	Percentage of patients with diabetes most recent BP 140/90 or greater	20	29.9 (22.9-36.8)	0.0-68.1	<=35%
	Percentage of patients with diabetes with most recent BP less than 130/80	20	45.9 (39.9-51.8)	20.0-72.0	>=25%
	Percentage of patients with diabetes with most recent BP less than 140/80	19	54.7 (44.8-64.7)	16.0-78.9	
Diabetes–Lipid control	Percentage of patients with diabetes with lipid testing (LDL) recorded within previous 12 months	20	83.7 (78.9-88.5)	58.6-100.0	>=80%
	Percentage of patients with diabetes with most recent LDL less than 100	20	48.1 (42.5-53.7)	27.8-68.0	>=36%
	Percentage of patients with diabetes with most recent LDL 130 mg/dl or greater	20	27.8 (20.6-35.0)	8.0-73.2	<=37%
Diabetes–Nephropathy screen	Percentage of patients with diabetes with nephropathy screening or evidence of nephropathy documented within previous 12 months	20	65.1 (53.3-76.8)	1.9-100.0	>=80%
Diabetes–Eye exam	Percentage of patients with diabetes with dilated retinal eye exam within appropriate period	20	49.9 (37.2-62.6)	0.0-100.0	>=60%
Diabetes–Foot exam	Percentage of patients with diabetes with foot exam within previous 12 months	20	60.0 (47.2-72.9)	1.6-100.0	>=80%
Diabetes—Smoking status assessed and smoking cessation advised or treatment offered	Percentage of patients with diabetes with documentation of smoking status *and,* if a smoker, documentation of cessation counseling or treatment within the past 12 months	18	77.7 (64.7-90.6)	16.7-100.0	>=80%

*Of the 20 practices reporting, 8 derived data from chart reviews (25 charts reviewed), and 12 used electronic sources such as their EMR or registry. Two practices were unable to report complete baseline data (fourth quarter of 2008). Operational definitions of measures are in Appendix D.

Table C-2. Average clinical quality measures at baseline, chronic care cardiovascular disease (CVD) measures, PCMH Pilot adult practices (n=20)*

Measure	Definition	Number of practices reporting	Average percent (confidence interval)	Range	Target
Chronic Care – Cardiovascular Disease					
CVD – Blood pressure control	Percentage of patients with CVD with BP recorded within previous 12 months	20	94.6 (91.5-97.7)	81.1-100.0	>=85%
	Percentage of patients with CVD with most recent BP less than 140/90 mm Hg	20	72.2 (67.5-76.9)	48.7-96.0	>=75%
CVD – Lipid control	Percentage of patients with CVD with complete lipid profile recorded within previous 12 months	20	74.3 (67.9-80.7)	47.2-95.2	>=80%
	Percentage of patients with CVD with most recent LDL less than 100 mg/dl	20	49.3 (40.9-57.7)	12.8-80.0	>=50%
CVD – Use of aspirin or other anti-thrombotic	Percentage of patients with CVD with documentation of use of aspirin or another antithrombotic within previous 12 months if not contraindicated	20	78.2 (68.1-88.4)	35.9-100.0	>=80%
CVD – Smoking status assessed and smoking cessation advice documented or treatment offered	Percentage of patients with CVD with documentation of smoking status and, if smoker, documentation of cessation counseling or treatment within the past 12 months	18	73.2 (58.6-87.8)	0.0-100.0	>=80%

*Of the 20 practices reporting, 8 derived data from chart reviews (25 charts reviewed), and 12 used electronic sources such as their EMR or registry. Two practices were unable to report complete baseline data (fourth quarter of 2008). Operational definitions of measures are in Appendix D.

Table C-3. Average clinical quality measures at baseline, preventive care and behavioral health measures, PCMH Pilot adult practices (n=20)*

Measure	Definition	Number of practices reporting	Average percent (confidence interval)	Range
Preventive Care				
Influenza vaccination	Percentage of patients ≥50 yrs who receive influenza vaccine in the past 12 months	19	43.2 (36.1-50.2)	15.1-72.0
Pneumococcal immunization	Percentage of patients ≥ 65 yrs with at least one pneumococcal immunization in their life-time	19	53.7 (42.1-65.4)	8.0-92.8
Breast cancer screening	Percentage of female patients receiving breast cancer screening within past 24 months	19	58.0 (43.0-72.9)	0.0-96.0
Cervical cancer screening	Percentage of female patients receiving cervical cancer screening within past 36 months	18	52.4 (38.7-66.0)	0.0-92.0
Colon cancer screening	Percentage of patients receiving colon cancer screening within appropriate time interval	19	43.9 (32.2-55.7)	1.3-87.2
Behavioral Health				
Depression screening for patients with diabetes or CVD	Percentage of patients with diabetes or CVD with screening for depression in previous 12 months	20	50.4 (31.1-69.6)	0.0-100.0

*Of the 20 practices reporting, 8 derived data from chart reviews (25 charts reviewed), and 12 used electronic sources such as their EMR or registry. Two practices were unable to report complete baseline data (fourth quarter of 2008). Operational definitions of measures are in Appendix D. Targets for measures are to be determined.

Table C-4. Average clinical quality measures at baseline, meaningful use core measures, PCMH Pilot adult practices (n=10)*

Measure	Definition	Number of practices reporting	Average percent (confidence interval)	Range
Hypertension				
Blood pressure control for hypertensive patients	Percentage of patient visits for patients aged 18 and older with a diagnosis of hypertension who have been seen for at least 2 office visits, with blood pressure (BP) recorded.	9	99.2 (98.1-100.0)	96.0-100.0
	Percentage of patients 18-85 years of age who had a diagnosis of hypertension and whose BP was adequately controlled during the measurement year.	9	81.8 (76.6-87.0)	71.6-92.0
Risk Behaviors				
Adult Weight Screening and Follow Up	Percentage of patients aged 18 years and older with a calculated BMI in the past six months or during the current visit documented in the medical record AND if the most recent BMI is outside parameters, a follow up plan is documented.	10	55.0 (34.7-75.3)	0.0-95.1
Preventive Care and Screening Measure Pair: a. Tobacco Use b. Tobacco Cessation Intervention	Percentage of patients aged 18 years and older who have been seen for at least 2 office visits who were queried about tobacco use one or more times within 24 months	10	92.2 (85.3-99.2)	71.8-100.0
	Percentage of patients aged 18 years and older identified as tobacco users within the past 24 months and have been seen for at least 2 office visits, who received cessation intervention.	10	54.0 (25.2-82.7)	0.9-100.0

* Of the 20 practices reporting, only 10 practices were able to submit data for these five measures. For the 10 practices reporting, 5 derived data from chart reviews (25 charts reviewed), and 5 used electronic sources such as their EMR or registry. Target measures are to be determined. Operational definitions of measures are in Appendix D.

Appendix D – Operational Definitions for Clinical Quality Measures

CITIZENS HEALTH INITIATIVE

Maine & New Hampshire Patient Centered Medical Home Pilots
Clinical Quality Measures - Adult Practices

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
CHRONIC CARE					
Diabetes[3] - Glucose control	1. Percentage of patients with diabetes with at least one HbA1c test within previous 12 months	**Numerator:** Number of patients age 18-75 years with diabetes with at least HbA1c test within 12 months prior to report date **Denominator:** Total number of active patients[4] in the practice age 18-75 with diabetes.	NCQA NQF 0057 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=850#k=0057&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Process	≥ 85%
	2. Percentage of patients with diabetes with most recent HbA1c level less than 7%	**Numerator:** Number of patients age 18-75 years with diabetes with HbA1C less than 7.0% on their most recent measurement **Denominator:** Total number of active patients age 18-75 with diabetes.	NCQA	Outcome	≥ 40%

[1] "Meaningful Use" measures as included in DHHS/CMS "National Proposed Rule-Making" (NPRM) Dec 2009; measures listed are meaningful use measures proposed for Primary Care unless otherwise noted

[2] Pilot goals were set for diabetes & CVD using NCQA Physician Recognition program targets; goals for preventive health measures will be established using baseline performance data from Pilot practices

[3] "Diabetes" defined per NCQA Diabetes Physician Recognition Program - See Appendix A

[4] "Active patients" in practice = patients who identify the practice as their primary care provider and have been seen in practice at least once in past 2 years (may exclude patients seen once in past 2 years who are known to receive majority of their primary care from another primary care practice)

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Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
	3. Percentage of patients with diabetes with most recent HbA1c less than 8%	**Numerator:** Number of patients age 18-75 years with diabetes with HbA1C less than 8% on their most recent measurement **Denominator:** Total number active patients age 18-75 with diabetes.	*Meaningful Use* NCQA NQF 0575 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=944#k=0575&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Outcome	≥ 60%
	4. Percentage of patients with diabetes with most recent HbA1C greater than 9%	**Numerator:** Number of patients age 18-75 years with diabetes with HbA1C greater than 9% on their most recent measurement, or who did not have HbA1C measurement within past 12 mos. **Denominator:** Total number active patients age 18-75 with diabetes.	*Meaningful Use* NCQA NQF 0059 PQRI 1 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1225#k=0059&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Outcome	≤ 15%
Diabetes – Blood pressure control	5. Percentage of patients with diabetes with BP recorded within previous 12 months	**Numerator:** Number of patients age 18-75 years diabetes with BP recorded within prior 12 months **Denominator:** Total number of active patients in the practice age 18-75 with diabetes.	NCQA NQF 0061 http://www.qualityforum.org/Mea	Process	≥ 85%

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
			sureDetails.aspx?actid=0&SubmissionId=1235#k=0061&e=1&st=&sd=&mt=&cs=&s=n&so=n&p=1		
	6. Percentage of patients with diabetes most recent BP 140/90 or greater	**Numerator:** Number of patients age 18-75 years with diabetes with BP 140/90 or greater on their most recent measurement, or who did not have BP measurement within past 12 months. **Denominator:** Total number of active patients age 18-75 with diabetes.	NCQA	Outcome	≤ 35%
	7. Percentage of patients with diabetes with most recent BP less than 130/80	**Numerator:** Number of patients age 18-75 years with diabetes with BP less than 130/80 on their most recent measurement **Denominator:** Total number of active patients age 18-75 with diabetes.	NCQA	Outcome	≥ 25%
	8. Percentage of patients with diabetes with most recent BP less than 140/80	**Numerator:** Number of patients age 18-75 years with diabetes with BP less than 140/80 on their most recent measurement **Denominator:** Total number of active patients age 18-75 with diabetes.	*Meaningful Use* PQRI 3	Outcome	

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
Diabetes – Lipid control	9. Percentage of patients with diabetes with lipid testing (LDL) recorded within previous 12 months	**Numerator:** Number of patients age 18-75 years with diabetes with LDL testing recorded within previous 12 months **Denominator:** Total number of active patients in the practice age 18-75 with diabetes.	NCQA NQF 0063 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1227#k=0063	Process	≥80%
	10. Percentage of patients with diabetes with most recent LDL less than 100	**Numerator:** Number of patients age 18-75 years with diabetes with LDL less than 100 on their most recent measurement **Denominator:** Total number of active patients age 18-75 with diabetes.	*Meaningful Use* NCQA NQF 0064 PQRI 2 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1228#k=0064	Outcome	≥ 36%
	11. Percentage of patients with diabetes with most recent LDL 130 mg/dl or greater	**Numerator:** Number of patients age 18-75 years with diabetes with LDL 130 mg/dl or greater on their most recent measurement, or who did not have an LDL measurement in the past 12 months **Denominator:** Total number of active patients age 18-75 with diabetes.	NCQA	Outcome	≤ 37%

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
Diabetes - Nephropathy screening[5]	12. Percentage of patients with diabetes with nephropathy screening or evidence of nephropathy documented within previous 12 months	**Numerator:** Number of patients age 18-75 years with diabetes with nephropathy screen or evidence of nephropathy documented[5] within previous 12 months **Denominator:** Total number of active patients in the practice age 18-75 with diabetes.	*Meaningful Use (Endocrinology)* NCQA NQF 0062 PQRI 119 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1226#k=0062	Process	≥ 80%
Diabetes – Dilated retinal (eye) exam	13. Percentage of patients with diabetes with dilated retinal eye exam within appropriate period	**Numerator:** Number of patients age 18-75 years with diabetes with eye exam within previous 24 months for those without previous retinopathy, or within previous 12 months for those previously diagnosed with retinopathy **Denominator:** Total number of active patients in the practice age 18-75 with diabetes.	*Meaningful Use (Endocrinology)* NCQA PQRI 117 NQF 0055 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1223#k=0055	Process	≥ 60%
Diabetes – Comprehensive foot exam	14. Percentage of patients with diabetes with foot exam within previous 12 months	**Numerator:** Number of patients age 18-75 years with diabetes with foot exam within previous 12 months, or those with history of double lower extremity amputation	*Meaningful Use (Podiatry)* NCQA NQF 0056	Process	≥ 80%

[5] "Nephropathy screening" and "evidence of nephropathy" are defined per NCQA Diabetes Physician Recognition Program definitions – See Appendix B

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
		Denominator: Total number of active patients in the practice age 18-75 with diabetes.	PQRI 163 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1224#k=0056		
Diabetes -Smoking status assessed and smoking cessation advised or treatment offered	15. Percentage of patients with diabetes with documentation of smoking status *and*, if a smoker, documentation of cessation counseling or treatment within the past 12 months	**Numerator:** Number patients age 18-75 years with diabetes with documentation of smoking status who are either non-smoker, *or*, if smoker, had documentation of cessation counseling or treatment offered within the past 12 months **Denominator:** Total number of active patients in the practice age 18-75 with diabetes.	NCQA	Process	≥ 80%
CVD[6] – Blood pressure control	16. Percentage of patients with CVD with BP recorded within previous 12 months	**Numerator:** Number of patients age 18 years & older CVD with BP recorded within prior 12 months **Denominator:** Total number of active patients in the practice age 18 years & older with CVD.	NCQA	Process	≥ 85%
	17. Percentage of patients with CVD with most recent BP less than 140/90 mm Hg	**Numerator:** Number of patients age 18 years & older with CVD with BP less than 140/90 mm HG on their most recent measurement **Denominator:** Total number of active patients age 18 years & older with CVD.	*Meaningful Use* NCQA NQF 0073 PQRI 201 http://www.qualityforum.org/MeasureDetails.aspx?	Outcome	≥ 75%

[6] CVD = Cardiovascular disease, defined per NCQA Heart/Stroke Physician Recognition Program – See Appendix C for definition

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
			actid=0&SubmissionId=1231#k=0073		
CVD – Lipid control	18. Percentage of patients with CVD with complete lipid profile recorded within previous 12 months	**Numerator:** Number of patients age 18 years & older with CVD with complete lipid profile recorded within prior 12 months **Denominator:** Total number of active patients in the practice age 18 years & older with CVD.	*Meaningful Use* NCQA NQF 0075 PQRI 202 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1232#k=0075	Process	≥ 80%
	19. Percentage of patients with CVD with most recent LDL less than 100 mg/dl	**Numerator:** Number of patients age 18 years & older with CVD with LDL less than 100 mg/dl on their most recent measurement **Denominator:** Total number of active patients age 18 years & older with CVD.	*Meaningful Use* NCQA PQRI 203 NQF 0075 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1232#k=0075	Outcome	≥ 50%

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
CVD – Use of aspirin or other anti-thrombotic	20. Percentage of patients with CVD with documentation of use of aspirin or another antithrombotic within previous 12 months if not contraindicated	**Numerator:** Number of patients age 18 years & older with CVD with documentation of use of aspirin or other antithrombotic therapy over the past 12 months **Denominator:** Total number of active patients in the practice age 18 years & older with CVD.	*Meaningful Use* NCQA NQF 0068 PQRI 204 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1229#k=0068	Process	≥ 80%
CVD – Smoking status assessed and smoking cessation advice documented or treatment offered	21. Percentage of patients with CVD with documentation of smoking status and, if smoker, documentation of cessation counseling or treatment within the past 12 months	**Numerator:** Number patients age 18 years & older with CVD with documentation of smoking status who are either non-smoker, *or*, if smoker, had documentation of cessation counseling or treatment within the past 12 months **Denominator:** Total number of active patients in the practice age 18 years & older with CVD.	NCQA	Process	≥ 80%
PREVENTIVE CARE					
Influenza immunization	22. Percentage of patients ≥50 yrs who receive influenza vaccine in the past 12 months.	**Numerator:** Number of patients 50 years or older who receive influenza immunization within previous 12 months **Denominator:** Total number of active patients in the practice[4] age 50 and older.	*Meaningful Use* NQF 0041 PQRI 110 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=307#k=00	Process	TBD

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
			41		
Pneumococcal immunization	23. Percentage of patients ≥ 65 yrs with at least one pneumococcal immunization in their lifetime	**Numerator:** Number of patients 65 and over who have had a pneumococcal immunization in their lifetime **Denominator:** Total number of active patients in the practice[4] age 65 and over.	*Meaningful Use (Pulmonary)* NQF 0043 PQRI 111 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=492#k=0043	Process	TBD
Breast cancer screening	24. Percentage of female patients receiving breast cancer screening within past 24 months	**Numerator:** Number female patients age 50-69 yrs with breast cancer screening within 24 months prior to report date **Denominator:** Total number of active female patients in the practice[4] age 50-69 years (exclude women with bilateral mastectomy).	*Meaningful Use* PQRI 112 *(use 40-69yo)* NQF 0031 *(uses 50-69yo)* http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=392#k=0031&c=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Process	TBD

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
Cervical cancer screening	25. Percentage of female patients receiving cervical cancer screening within past 36 months	**Numerator:** Number female patients age 21-64 yrs with cervical cancer screening within 36 months prior to report date **Denominator:** Total number of active female patients in the practice[4] age 21-64 years (exclude women who have had a total hysterectomy with removal of the cervix).	*Meaningful Use* NQF 0032 *(use 18-64yo, with screen in past 24 mos)* http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=393#k=0032&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Process	TBD
Colon cancer screening	26. Percentage of patients receiving colon cancer screening within appropriate time interval	**Numerator:** Number of patients age 50-75years with colon cancer screening within appropriate time interval, defined as follows: • Colonoscopy within past 10 yrs, *OR* • Flexible sigmoidoscopy or barium enema within past 5 yrs, *OR* • Fecal occult blood test within past year **Denominator:** Total number of active patients in the practice[4] age 50-75.	*Meaningful Use* NQF 0034 *(uses 50-80yo)* PQRI 113 *(uses 50-75yo)* http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=394#k=0034&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Process	TBD
BEHAVIORAL HEALTH					

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
Depression screening for patients with diabetes or CVD	27. Percentage of patients with diabetes or CVD with screening for depression in previous 12 months	**Numerator:** Number of patients with diabetes age 18-75 years or CVD age 18 and older who have had depression screening using PHQ-9 or other validated tool within previous 12 mos **Denominator:** Total number of active patients in the practice with diabetes age 18-75 or with CVD age 18 and older.		Process	TBD
HYPERTENSION					
Blood pressure control for hypertensive patients (Meaningful Use Core Measure)	28. Percentage of patient visits for patients aged 18 and older with a diagnosis of hypertension who have been seen for at least 2 office visits, with blood pressure (BP) recorded.	**Numerator:** Number patients age 18 and older with diagnosis of hypertension who have been seen for at least 2 office visits, with blood pressure recorded during the 12-month reporting period. **Denominator:** Total number of active patients in the practice[4] age 18 and older with hypertension who have been seen for at least 2 office visits during reporting period.	*Meaningful Use* NQF 0013 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=373#k=0013	Process	TBD[7]
	29. Percentage of patients 18-85 years of age who had a diagnosis of hypertension and whose BP was adequately controlled during the measurement year.	**Numerator:** Number of patients 18-85 years of age who had diagnosis of hypertension whose BP was adequately controlled during the 12 month reporting period. **Denominator:** Total number of active patients 18-85 years of age with diagnosis of hypertension during 12 month reporting period.	*Meaningful Use* NQF 0018 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=1236#k=0018&e=1&st=&sd	Outcome	TBD

[7] Pilot goals for preventive care measures are to be determined (TBD) pending collection of baseline data from Pilot practices and establishment of best-practice benchmarks

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
			=&s=n&so=a&p=2&mt=&cs=		
RISK BEHAVIORS					
Adult Weight Screening and Follow Up (Meaningful Use Core Measure)	30. Percentage of patients aged 18 years and older with a calculated BMI in the past six months or during the current visit documented in the medical record AND if the most recent BMI is outside parameters, a follow up plan is documented.	**Numerator:** Number of patients age 18 years and older with a calculated BMI in the past six months or during recent visit documented in medical record AND if outside parameters, a follow-up plan documented. The Nutrition Screening Initiative suggested BMI range is 22-27 **Denominator:** Total number of active patients in the practice[4] age 18 years and older.	*Meaningful Use* NQF 0421 PQRI 128 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=526#k=0421&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Process	TBD
Preventive Care and Screening Measure Pair: a. Tobacco Use b. Tobacco Cessation Intervention (Meaningful Use Core Measure)	31. Percentage of patients aged 18 years and older who have been seen for at least 2 office visits who were queried about tobacco use one or more times within 24 months	**Numerator:** Number of patients aged 18 years and older who have been seen for at least 2 office visits who were queried about tobacco use one or more times within 24 months. **Denominator:** Total number of active patients in the practice[4] aged 18 years or older who have been seen for at least two office visits.	*Meaningful Use* NQF 0028 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=391#k=0028&e=1&st=&sd=	Process	TBD

Measure Category	Operational Definition (Numerator/Denominator)		Meaningful Use[1] NCQA/NQF/ PQRI Measure #	Type	Pilot Goal[2]
			&mt=&cs=&s=n&so=a&p=1		
	32. Percentage of patients aged 18 years and older identified as tobacco users within the past 24 months and have been seen for at least 2 office visits, who received cessation intervention.	**Numerator:** Number of patients aged 18 years and older identified as tobacco users within the last 24 months and have been seen for at least 2 office visits who received cessation intervention. **Denominator:** Total number of active patients in the practice[4] aged 18 years or older who have been identified as tobacco users within the last 24 months and have been seen for at least two office visits.	*Meaningful Use* NQF 0028 http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=391#k=0028&e=1&st=&sd=&mt=&cs=&s=n&so=a&p=1	Process	TBD

APPENDIX A: Definition of Diabetes Mellitus

Definition:

1. Adult patient between ages of 18 and 75 years old.
2. Has had a diagnosis of diabetes using American Diabetes Association criteria (see below) and any of the following:
   - ICD-9 250.x (diabetes mellitus); 648.0 (diabetes complicating pregnancy, but *excludes* gestational diabetes, 648.8); 357.2 (diabetic polyneuropathy); 362.0 (diabetic retinopathy); or 366.41 (diabetic cataract)
   - And/or has notation of prescribed routine use of insulin or oral hypoglycemics/antihyperglycemics within past 12 months.
3. Has been under the care of the participating physician or physician group for diabetes for at least 12 months. This is defined by documentation of a face-to-face visit for diabetes care between the physician and the patient that *predates* the most recent visit by at least 12 months.

In addition, please adhere to the following criteria when reporting diabetes clinical quality measures:

- Include all patients regardless of payer (e.g. commercial, Medicare, Medicaid, self-pay, uninsured, etc.).
- Include only patients who are active patients in your practice – i.e. the patient has had 1 or more visits of any type to the practice within the past 2 years, and there is no other known primary care provider. May exclude patients seen once in past 2 years who are known to receive majority of their primary care from another primary care practice.
- Clinically verify that all the patients meet the ADA definition for diabetes (see below).

American Diabetes Association (ADA) Criteria[1] for Diagnosis of Diabetes Mellitus:

1) Hemoglobin A1C ≥6.5%*, *OR*
2) Fasting Plasma Glucose ≥126 mg/dl (7.0 mmol/l). Fasting is defined as no caloric intake for at least 8 hrs*, *OR*
3) Two-hour plasma glucose ≥200 mg/dl (11.1 mmol/l) during an oral glucose tolerance test (OGTT). The test should be performed as described by the World Health Organization, using a glucose load containing the equivalent of 75 g anhydrous glucose dissolved in water, *OR*
4) In a patient with classic symptoms of hyperglycemia or hyperglycemic crisis, a random plasma glucose ≥200 mg/dl (11.1 mmol/l).

*(*In the absence of unequivocal hyperglycemia, criteria 1–3 should be confirmed by repeat testing.)*

*As outlined in National Committee on Quality Assurance (NCQA) Diabetes Physician Recognition Program: http://www.ncqa.org/tabid/139/Default.aspx

** From ADA's Clinical Practice Recommendations 2010 – see http://care.diabetesjournals.org/content/33/3/692.2

Appendix B: Definition of Nephropathy Testing

1) **Documentation of a nephropathy screening or evidence of nephropathy must include one of the methods below.**
   - Microalbuminuria test (including a microalbumin/creatinine ratio, a 24-hour urine for microalbuminuria, timed urine for microalbuminuria or spot urine for microalbuminuria)
   - Positive urinalysis for protein (microalbuminuria) test
   - Medical attention for nephropathy:
     - Includes any nephrologist visit or documentation of arterionephrosclerosis, azotemia, chronic renal disorder, chronic renal insufficiency, diabetic kidney disease, diabetic nephropathy, diffuse diabetic or nodular glomerulosclerosis, end stage

renal disease (ESRD), Kimmelstiel-Wilson lesion, microalbuminuria, papillary necrosis, proteinuria, renal insufficiency, acute renal failure, or renal dialysis.

- Evidence of ACE inhibitor/ARB therapy

2) Codes to identify nephropathy screening or evidence of / medical attention for nephropathy include the following:

- *Codes to Identify Microalbuminuria Test*
  - CPT Codes: 82042, 82043, 82044, 83518, 84156, 84160* 84166*, 84165*
    (* must be accompanied by CPT code 81050 to indicate the test was urinalysis)
- *Codes to Identify Macroalbuminuria Test*
  - CPT Codes: 81000–81003*, 81005*
    (* must be confirmed as a positive result for a macroalbuminuria test)
- *Codes to Identify Diagnosis of or Treatment for Nephropathy*
  - CPT Codes: 36800, 36810, 36815, 36818, 36819, 36820, 36821, 50300, 50340, 50360, 50365, 50370, 50380, 90920, 90921, 90924, 90925, 90935, 90937, 90945, 90947, 90989, 90993, 90997, 90999
  - ICD-9-CM Codes: 39.27, 39.42, 39.43, 39.53, 39.93-39.95, 54.98, 55.4–55.6, 250.4, 403, 404, 405.01, 405.11, 405.91, 581.81, 582.9, 583.81, 584-586, 588, 753.0, 753.1, 791.0
  - V Codes: V42.0, V45.1, V56
  - Revenue Codes: 0800–0804, 0809, 0820–0825, 0829–0835, 0839–0845, 0849–0855, 0859–0882, 0889
  - DRGs: 316, 317.

3) The following are not acceptable documentation of nephropathy screening:

- Patient self-report or self-monitoring
- Findings reported in progress notes or other non-laboratory documentation

APPENDIX C: Definition of Cardiovascular Disease

Definition:

1. Adult patient ages 18 and older.
2. Has had a diagnosis of cardiovascular disease (CVD), as defined by diagnoses below*, for at least 12 months
3. Has been under the care of the participating physician or physician group for CVD at least 12 months. This is defined by documentation of a face-to-face visit for CVD between the physician and the patient that *predates* the most recent visit by at least 12 months.

In addition, please adhere to the following criteria when reporting diabetes clinical quality measures:

- Include all patients regardless of payer (e.g. commercial, Medicare, Medicaid, self-pay, uninsured, etc.).
- Include only patients who are active patients in your practice – i.e. the patient has had 1 or more visits of any type to the practice within the past 2 years, and there is no other known primary care provider. May exclude patients seen once in past 2 years who are known to receive majority of their primary care from another primary care practice.

ICD Diagnosis and CPT Codes*:

- **Coronary Heart Disease:** 411, 411.0, 411.1, 411.81, 411.89, 414.0
- **Acute Myocardial Infarction**: 410, 410.00-410.02, 410.0-410.9, 410.10-410.12, 410.20-410.22, 410.30-410.32, 410.40-410.42,
  410.50-410.52, 410.60-410.62, 410.70-410.72, 410.80-410.82, 410.90-410.92, 411, 411.0, 411.1, 411.81, 411.89
- **Stable Angina**: 413-413.1, 413.9
- **Percutaneous Coronary Intervention**: CPT 92980-92981, 92982, 92984, 92995, 92996, 92997, 92998
- **Coronary Artery Bypass Graft**: CPT 33510-33519, 33521-33523, 33533-33536, 33542, 33545, 35600, 35601, 35606, 35612, 35616, 3562, 35623, 35626, 35631, 35636, 35641, 35642, 35645, 35646, 35647, 35650, 35651, 35654, 35656, 35661, 35663, 35665, 35666, 35671, 33572, 35500-35571
- **Peripheral Arterial Disease / Lower Extremity**: 440.20-440.24, 440.29, 447.0-447.9, 444-444.2, 444.8-444.9
- **Cerebrovascular Disease/ Ischemia**: 435, 435.0, 435.1, 435.3, 435.8, 435.9

- **Cerebrovascular Disease/ Stroke**: 437.0-437.9, 438.0-438.2, 438.10-438.12, 438.20, 438.21, 438.22, 438.3, 438.30-438.32, 438.4,438.40-438.42, 438.6-438.8, 438.81-438.85, 438.89, 438.9
- **Cerebrovascular Disease/ Atheroembolism**: 444.0, 444.1, 445.0, 445.8, 445.01, 445.02, 445.81, 445.89

*As outlined in National Committee on Quality Assurance (NCQA) Heart Stroke Recognition Program: http://www.ncqa.org/hsrp/

Additional Measures Clarification

- **CVD denominator: We will assume all visits for patients with this problem would address CVD.**

If I understand you're the question, you are wondering what the denominator would be. Again, definitions attached but denominator is the total number of active patients in the practice age 18 years & older with CVD. Not sure if we might be missing the question here? (if so, please clarify)

- **Why HgbA1c between 8.0 and 9.0 is not being reported? Currently we are only reporting on < 7.0, < 8.0 (which would include patients with a level < 7.0) and > 9.0?**

In the Pilot clinical measures, we made a commitment to use exist national quality measures such as NCQA, NQF, and, now, "meaningful use" measures. There is no such measure for A1c between 8.0-9.0. We are collecting both A1c<7 and A1c<8 (which, you're right, also includes those with A1c<7) because NCQA Diabetes Recognition program includes both of these (and <8 is now an optional meaningful use clinical measure).

- **Are sites in Maine counting monofilament testing under diabetic foot exam?**

Am attaching copy of the NQF definition which does include monofilament testing as a method – i.e. they appear to define "foot exam" as visual inspection with either sensory (monofilament) exam or pulse exam:

The percentage of patients aged 18-75 years with diabetes (type 1 or type 2) who had a foot exam (visual inspection, sensory exam with monofilament, or pulse exam).

Of note, the NQF definition also references ADA guidelines for "comprehensive foot exam" which includes examination of pulses AND sensation (monofilament or vibration perception).

American Diabetes Association Guidelines/ Recommendations: Perform annual comprehensive foot examination to identify risk factors predictive of ulcers and amputations. The foot examination should include inspection, assessment of foot pulses, and testing for loss of protective sensation (10-g monofilament plus testing any one of: vibration using 128-Hz tuning fork, pinprick sensation, ankle reflexes, or vibration perception threshold).

- **Are sites in Maine defining complete lipid profile as having Total Cholesterol, Triglycerides, LDL and HDL all within the last 12 months?**

  Again, am attaching the measures and the copy of the NQF definition, which confirms that "lipid profile" does include LDL, HDL, total chol, and TG's within the measurement year

- **For the prevention measure on breast cancer screening, is breast cancer screening defined as a manual breast exam by the health care provider, or by screening mammography, or either one of these?**

  PCMH Pilot breast cancer screening measure is intended to look for screening mammography, not clinical breast exam. This comes directly from the PQRI measure definition (PQRI measure #112), which I've copied and pasted below (though will acknowledge that we've used age 50-69yo, vs. the original 40yo from PQRI, because of the change in USPSTF recommendations that came out after the PQRI measure was established). I'm not aware of any breast cancer screening guidelines that include clinical breast exam as an appropriate alternative to mammography, but please let me know if you're hearing otherwise.

  Measure #112: Preventive Care and Screening: Screening Mammography
  2010 PQRI REPORTING OPTIONS FOR INDIVIDUAL MEASURES: CLAIMS, REGISTRY
  DESCRIPTION:
  Percentage of women aged 40 through 69 years who had a mammogram to screen for breast cancer within 24 months
  INSTRUCTIONS:
  This measure is to be reported a minimum of once per reporting period for female patients seen during the reporting period. There is no diagnosis associated with this measure. The patient should either be screened for breast cancer on the date of service OR there should be documentation that the patient was screened for breast cancer at least once within 24 months prior to the date of service. Performance for this measure is not limited to the reporting period. This measure may be reported by clinicians who perform the quality actions described in the measure based on services provided and the measure-specific denominator coding.

  Measure Reporting via Claims:

CPT codes and patient demographics are used to identify patients who are included in the measure's denominator. CPT Category II codes are used to report the numerator of the measure.
When reporting the measure via claims, submit the listed CPT codes, and the appropriate CPT Category II code OR the CPT Category II code with the modifier. The modifiers allowed for this measure are: 1P- medical reasons, 8P- reason not otherwise specified. All measure-specific coding should be reported ON THE SAME CLAIM.

Measure Reporting via Registry:
CPT codes and patient demographics are used to identify patients who are included in the measure's denominator. The numerator options as described in the quality-data codes are used to report the numerator of the measure. The quality-data codes listed do not need to be submitted for registry-based submissions however these codes may be submitted for those registries that utilize claims data.

NUMERATOR:
Patients who had a mammogram at least once within 24 months
Numerator Quality-Data Coding Options for Reporting Satisfactorily:
Mammogram Performed
CPT II 3014F: Screening mammography results documented and reviewed
OR
Mammogram not Performed for Medical Reasons
Append a modifier (**1P**) to CPT Category II code **3014F** to report documented circumstances that appropriately exclude patients from the denominator.
3014F *with* 1P: Documentation of medical reason(s) for not performing a mammogram (i.e., women who had a bilateral mastectomy or two unilateral mastectomies).
OR
Mammogram not Performed, Reason not Specified
Append a reporting modifier (**8P**) to CPT Category II code **3014F** to report circumstances when the action described in the numerator is not performed and the reason is not otherwise specified.
3014F *with* 8P: Screening mammography results were not documented and reviewed, reason not otherwise specified

DENOMINATOR:
All female patients aged 40 through 69 years
Denominator Criteria (Eligible Cases):
Patients aged 40 through 69 years on date of encounter
AND
Patient encounter during the reporting period (CPT): 99201, 99202, 99203, 99204, 99205, 99212, 99213, 99214, 99215

RATIONALE:

Breast cancer ranks as the second leading cause of death in women. For women 40 to 49 years of age mammography can reduce mortality by 17 percent. (AMA, 2003)

Integration of Health Care in Maine

Implications From the Multiple Chronic Conditions Project: Impact of mental illness and/or substance abuse on diabetes intervention and outcomes

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STRUCTURED ABSTRACT

Key Words: mental illness, behavioral health, multiple chronic medical conditions, diabetes

This longitudinal study examined the impact of co-morbid behavioral health disorders on utilization, cost, interventions and outcomes for Maine Medicaid members with diabetes and other chronic medical conditions. Half the cohort has a behavioral health (BH) diagnosis: mental illness, substance abuse, both mental illness/substance abuse or cognitive disorders; those with BH disorders have significantly higher numbers of chronic medical co-morbidities. At every level of medical co-morbidity, the BH groups have higher medical expenditures. All other factors being equal, any behavioral health disorder contributes as much to cost as having 3 or more chronic medical conditions. All populations with BH disorders have higher utilization of medical services: emergency room, hospital, 30 day re-admission, avoidable hospitalizations and outpatient visits. Fragmented primary care also drives higher utilization, and is more likely to be delivered to sicker populations. Populations with diabetes and BH disorders appear to have equal access to interventions, e.g. testing for glucose, or receipt of statins, but despite this and their higher utilization of medical services, they have poorer outcomes: higher rates of complications, and over time, worse diabetes and death, especially if their BH status worsens. Improved BH status appears protective of certain adverse outcomes. While these findings are more pronounced for the most impaired BH populations, the 20% of the cohort with less impairing disorders, such as depression or anxiety, have similar results. These results show the importance of integration of behavioral and physical health in efforts to improve health outcomes for persons with chronic medical conditions.

PURPOSE

INTRODUCTION

The Department of Health and Human Services' (HHS) strategic framework for persons with multiple chronic conditions moves patient care from an approach focused on individual chronic diseases to one that uses a multiple chronic conditions approach. This paradigm shift provides a foundation for realizing the vision of optimum health and quality of life for individuals with multiple chronic conditions.

Chronic medical conditions are recognized as a major driver of health care utilization, morbidity and mortality in the United States. Behavioral disorders are associated with even more disability than chronic medical conditions, accounting for almost half of the burden of disability in the developed world. Research suggests that significant interactions occur between mental illness and chronic medical conditions, with an increased prevalence of chronic medical conditions, greater morbidity, and poorer outcomes among persons with behavioral health disorders, but there are major gaps in our knowledge about "what works" for promoting better health in these populations. A critical issue is the lack of integration and coordination between the mental health and health systems of care. This disconnect exists at the local service level, between mental health, public health, and primary care practitioners, in workforce training programs, in the funding and regulatory environment and in health services research. Moreover, the dissemination of data and the translation of the science to service programs

proceeds separately within either the behavioral or physical health systems, with little communication between the two. Building on the data systems already in place in Maine, DHHS Offices of Adult Mental Health (OAMHS), MaineCare Services (OMS), Quality Improvement (OQI) and the Muskie School of Public Service at the University of Southern Maine have created analytic systems that provide data on the determinants of overall health of the complex populations served in Maine's publicly funded health system. This project aims to forward the development of analytic systems based on services data that can be updated in real time, in order to provide regular reports to administrators, providers and the public to inform policy, programming and quality improvement efforts for Medicaid members, both in Maine and in other states.

This five year analytic epidemiologic study compares the demographic and geographic characteristics, interventions (treatments, preventive services, diagnostic tests, medications), access to quality care, outcomes and costs for both behavioral health and medical care across different cohorts of Maine Medicaid members with/without diabetes and with/ without a number of different behavioral health disorders, including mental illness, substance abuse and cognitive impairments.

The main research questions were the following:

1. What is the impact for long term MaineCare (Medicaid) populations with behavioral health disorders and multiple chronic conditions on medical, psychiatric and total cost, utilization of care and outcomes?
2. What factors for persons with diabetes or risk for diabetes and behavioral health disorders are associated with development of complications, worse diabetes over time, new diabetes and death?

SCOPE

BACKGROUND

In the United States, rates of chronic health conditions are at record high levels. In a study of working-age adults, 75% had at least one chronic condition; 54% had multiple chronic conditions.[1] Twenty-three percent of Medicare beneficiaries have five or more chronic conditions, accounting for 68% of Medicare spending.[2] and 67% of disabled Medicaid beneficiaries have three or more chronic conditions.[3] Annual Medicare payments for a beneficiary with one chronic condition averages $7,172; payments increased to $32,498 for those with three or more conditions.[4]

Mental illnesses are also highly prevalent. Nearly 20% of Americans have been diagnosed with some type of mental illness; among Medicaid recipients, rates of psychiatric illnesses are especially high; 33% were diagnosed with mental illness, according to a recent report.[5] The most prevalent conditions are depression and anxiety disorders, but an estimated 3% of the U.S. population suffers from more severe and disabling mental illness, such as schizophrenia, depression, or bipolar disorder.

Additionally, comorbid chronic medical diseases, such as diabetes, cardiovascular disease, asthma and arthritis, are more common among patients with mental illness. Persons with co-morbid mental illness

and chronic medical conditions also have poorer outcomes. In the general population, persons with depression and coronary artery disease are two to six times more likely to die after having a heart attack or suffering heart failure.[6] A meta-analytic literature review of persons co-morbid with diabetes and depression, depression has been shown to be associated with poor glycemic control.[7] The negative impact of medical co-morbidities is even more pronounced among persons with Serious Mental Illness (SMI), who are at risk of dying 25 years earlier than their age mates in the general population, not from their mental illness, but from heart disease, diabetes, and other chronic medical conditions.[8]

There are multiple factors associated with the increased prevalence, morbidity, and poor outcomes in these complex populations. Research suggests that common metabolic processes are shared among certain mental illnesses, diabetes, and cardiovascular disease, putting individuals with either the medical or the psychiatric disorder at risk for developing the other. Physiologic changes have been noted in cortisol metabolism, the epinephrine-norepinephrine axis, markers of endothelial inflammation, platelet stickiness and hypothalamic-pituitary-adrenal axis function.[9] Additionally, persons with mental illness have higher rates of health risk behaviors such as smoking, poor nutrition, and physical inactivity.[10]

Use of psychiatric medications, such as antipsychotics and certain antidepressants, can cause weight gain and worsen cardiovascular health. Having a mental illness makes management of chronic disease more challenging and requires appropriate care coordination.[11-12] Adherence to appropriate treatment, having a usual source of care, and collaborative care management are frequently cited as necessary components to improving the health of those with chronic disease and mental illness.[12-16] Diabetes care, for example, requires self-management by patients and ongoing monitoring by clinicians to prevent acute complications.[17] Alcohol and substance abuse, chronic conditions such as metabolic syndrome, use of antidepressant medication, and residence in lower-income neighborhoods can negatively impact treatment adherence.[18] Some studies show a correlation between lack of a usual source of care, increased visits to the emergency department and hospitalizations.[19-21] In one study of patients with diabetes and chronic kidney disease, greater care fragmentation resulted in a 15% increase of ED visits.[22]

Several studies have shown that as comorbidity increased, medical costs increased exponentially (eg. Anderson, 2005; Charlson, 2007; Hwang, 2001; Naessens, 2011). In Maine, an analysis of MaineCare (Medicaid) data by the DHHS Office of Quality Improvement shows that 5% of MaineCare members account for 55% of total claim payments. Another way of looking at this: 17,182 members account for $1.2 billion in claims. For this high cost group the top four diagnoses contributing to service use were intellectual disabilities and three mental health conditions.[*]

While there has been recognition of the high costs and high needs of people with multiple chronic conditions (MCC), traditional care delivery systems still focus on individual chronic diseases and insufficient attention has been paid to the prevention of chronic conditions, as well as enhancement of the clinical management and improvement of the health status of people with MCC.

[*] Maine DHHS Value Based Purchasing Initiative, 2012, http://www.maine.gov/dhhs/oms/pdfs_doc/vbp/CCHP_04062012_MaineCare_Report_pdf.pdf

POPULATIONS STUDIED

The population for this study consists of 18-64 year old Maine Medicaid members with continuous eligibility, defined as 22/24 months of eligibility, from Jan 1, 2007 to Dec 31, 2008. Medicaid recipients with any period of Medicare or other third party health insurance are excluded, since only a part of their claims data is available. Since the study examines data on this initial cohort through Dec 31, 2011, only members age 18-60 on Jan 1, 2007 were enrolled, so that no members of the cohort would reach age 65 (and have their claims covered by Medicare) before the end of the study period. The total number of individuals enrolled in the study cohort is 63,141, of whom 65.3% are female. The racial distribution of the cohort reflects that of Maine as a whole, with 93.6% Caucasian. Among non-whites, African American (3% overall) and Native Americans (2.1% overall) are the most prominent.

Follow-up after the initial 2 year enrollment in the cohort showed relatively little loss (18%) in follow-up; adult Mainers who become continuously eligible for Medicaid appear to remain in Medicaid over the long term, making this population ideal for longitudinal study.

Although there are limitations associated with administrative data collected by payers, utilization of these existing data sets permits a longitudinal study without the additional expense and time usually associated with such studies. Medicaid populations are of particular interest because they represent a segment of the population with the highest rates of those adverse social circumstances known to affect morbidity and mortality: poverty, low education, and unstable housing and food resources. Maine Medicaid administrative data includes acute, long term care, behavioral health and pharmacy data. Rarely will you find information from all components of the health system in one administrative system. Moreover, methods for studying MCC in Medicaid populations can be applied in all 50 states, permitting cross state studies of comparative effectiveness of different policies, regulations and programming.

METHODS

ANALYTICAL APPROACH

Members with a behavioral health disorder were identified using ICD-9 diagnosis codes submitted on MaineCare claims data. Using CY2007-2008 data, members were categorized into the following hierarchy of Behavioral Health Groups:

1. Mental Retardation/Traumatic Brain Injury /Developmental Disability (MR/DD/TBI): 8,065 members. Can also be classified as a group with cognitive impairments.
2. Serious Mental illness (SMI) – members not categorized above, with no substance abuse, and with schizophrenia and related psychoses, bipolar disorders, or severe depression, or receiving long term mental health services restricted to those with severe functional impairments: 5163 members.
3. Other Mental Health Diagnosis (Non-SMI) – members not categorized above with two or more diagnoses of non SMI mental illness: 8,065 members.
4. Dual Diagnosis mental illness and substance abuse (MH/SA) **–** members with 2 more mental health (MH) diagnoses and 1 or more substance abuse (SA) diagnosis **; or** 1 or more MH diagnosis and 2 or more SA diagnoses. 8,065 members were identified.

5. Substance Abuse Only (SA only) – members not categorized above with two or more substance abuse related diagnoses: 1,509 members.
6. No Behavioral Health – members not categorized above: 32,373 members were identified.

Since the project focuses on diabetes, we categorized patients as either 'no diabetes', 'pre-diabetes', or 'diabetes'.

- Members were categorized as having diabetes in the baseline period when members had at least 1 Inpatient or 2 outpatient/physician claims with a diagnosis of diabetes OR members had claims for Insulin. 5847 (9.3%) members identified.
- Members were categorized as pre-diabetes/risk for diabetes when they had:
    - Only one outpatient/physician claim with a diagnosis of diabetes OR
    - Prescription for metformin OR
    - Diagnoses of dyslipidemia and obesity and hypertension OR
    - One of the following other diagnosis – acquired acanthosis nigricans or polycistic ovary syndome or dysmetabolic syndrome

  3585 (5.7%) members identified.

Our analyses showed that other chronic health conditions (e.g., asthma, cardiac disease) could be strongly related to outcomes being investigated, and as a consequence we categorized patients in terms of the number of such chronic medical conditions present. For this classification, we used the disease typology proposed by Hwang[23] and stratified by the number of chronic medical conditions. Definitions for these classificatory variables are provided on the project website: http://www.mainemcc.org/index.php?option=com_content&view=article&id=5&Itemid=2.

Outcomes that were examined include the following: total cost; behavioral health costs; medical/surgical costs; utilization of medical outpatient care, emergency room use, inpatient admissions and length of stay; 30 day hospital readmission; acute and chronic complications of diabetes; access to diabetes recommended processes of care; receipt and adherence to various medications; transition to diabetes in the follow-up years; development of worse diabetes; death.

The following intervening variables were examined in relationship to the various outcomes of interest:

- Demographic: age (18-44, 45-65), gender (M, F), residence location (micropolitan, rural);
- Behavioral health category: no BH diagnoses, serious mental illness diagnosis only (SMI), non-serious mental illness diagnosis only (non SMI MH), substance abuse diagnosis only (SA only), both mental illness and substance abuse diagnoses (MH/SA), and diagnosis of cognitive impairment (mental retardation, development disability, or traumatic brain injury - MR/DD/TBI);
- Count of chronic medical conditions: 2, 3, or 4 or more;
- Physician relationships: Relationship (yes,no) with a primary care physician (PCP), and fragmentation of primary care (yes/no);
- Access to recommended diabetes preventive care (Hemoglobin A1C , lipid, creatinine and urinary albumin testing, eye exam);
- Receipt of mental health care management;

- Receipt of antipsychotic medication, statins, ACE/ARB inhibitors, antidiabetic agents;
- Adherance to statins, anti-diabetic agents and antipsychotic medication.

We first performed univariate and bivariate analyses to examine distributions of key measures (e.g., costs per member per month, utilization of care, diabetes process measure, death) in our population and identify relationships between patient characteristics and outcomes of interest. Additionally, three types of multivariate analyses were employed in this study: least square regression, generalized linear models, and logistic regression. Regression techniques are a means of examining the contribution of multiple factors to a final outcome, one at a time, while holding all the other variables constant. A regression on cost, for example, permits the examination of the impact of each independent variable, e.g. gender, MCC status, behavioral health status one at a time, while holding all other variables constant

RESULTS

1. Behavioral Health Status and Prevalence of Multiple Chronic Conditions (MCC) and Diabetes

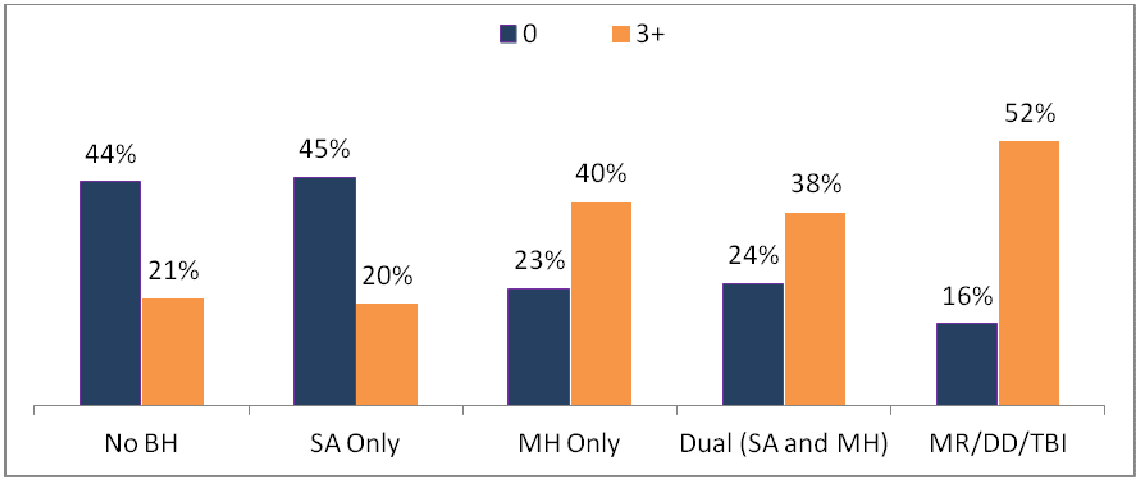
Major findings:

- **Long term adult Medicaid members have a high prevalence of both behavioral health disorders and chronic medical conditions.**
- **Persons with behavioral health diagnoses generally have more chronic medical conditions than those no behavioral health diagnosis.**
- **Persons with behavioral health disorders are a heterogeneous group in relation to their medical status. Those with the highest burden of MCC are persons with Serious Mental Illness and cognitive impairments (MR/DD/TBI), while those with substance abuse only more closely resemble persons with no behavioral health diagnoses.**

48.9% of the initial cohort has a behavioral health diagnosis. Most prevalent are non-SMI mental illness (19%) and dual diagnosis mental illness/substance abuse (12.4%). Persons with SMI comprise 8.2%, MR/DD/TBI 6.7% and SA only, 2.5%.

The prevalence of medical co-morbidities varies significantly by behavioral health status. 44% of those with no BH diagnosis have no chronic medical condition, as compared to 16-24% of persons with mental illness, dual diagnosis MH/SA or MR/DD/TBI. 21% of those with no BH disorder have 3 or more chronic medical conditions, compared to 38-52% of those with mental illness, dual diagnosis MH/SA or MR/DD/TBI. The only BH health group that does not appear to have an increase in MCC are those with SA only, whose rates are identical to the no BH group.

Figure 1. Persons with Behavioral Health disorders have higher rates of medical co-morbidity



The prevalence diabetes is also increased in the various behavioral health groups, with the exception of persons with SA only, who have lower prevalence (5.0%) than those with no behavioral health diagnosis (7.3%). The prevalence is increased among persons with SMI (15.9%), non SMI MH (10.4%), dual diagnosis MH/SA (8.9%).

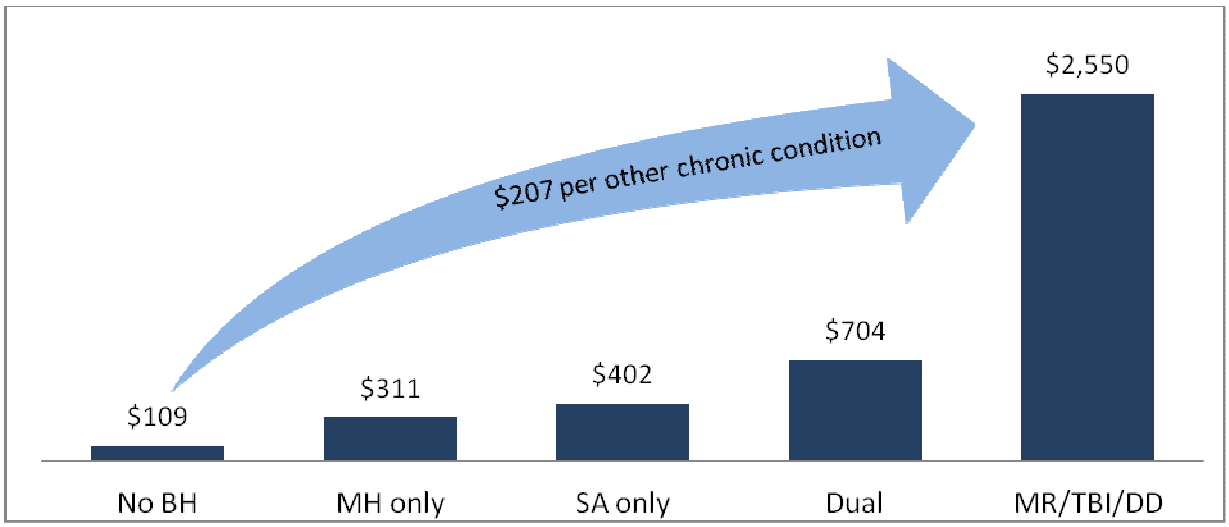
2. Costs

Major findings:

- **A behavioral health diagnosis is not just another co-morbidity. Having any behavioral health diagnosis contributes as much or more to cost as having 3 or more chronic medical conditions and far outweighs the contribution of demographic factors or access to primary care**
- **For most behavioral health groups (except MR/DD/TBI) medical/surgical costs account for significantly more than behavioral health costs. The total cost of care for most members is more heavily influenced by medical/surgical utilization than by behavioral health utilization.**
- **Medical/surgical costs are increased with the number of medical co-morbidities and also increased, at every level of medical co-morbidity, in all BH groups.**
- **Behavioral health costs for certain populations (SMI and dual diagnosis) increase with the number of medical co-morbidities**

Persons with a mental illness had three times the costs of a client without a behavioral health issue. These costs rise significantly, as clients with MR/TBI/DD have costs nearly 25 times greater than the non-behavioral health clients. With the addition of each other chronic condition, per member per month costs increase by $207 dollars.

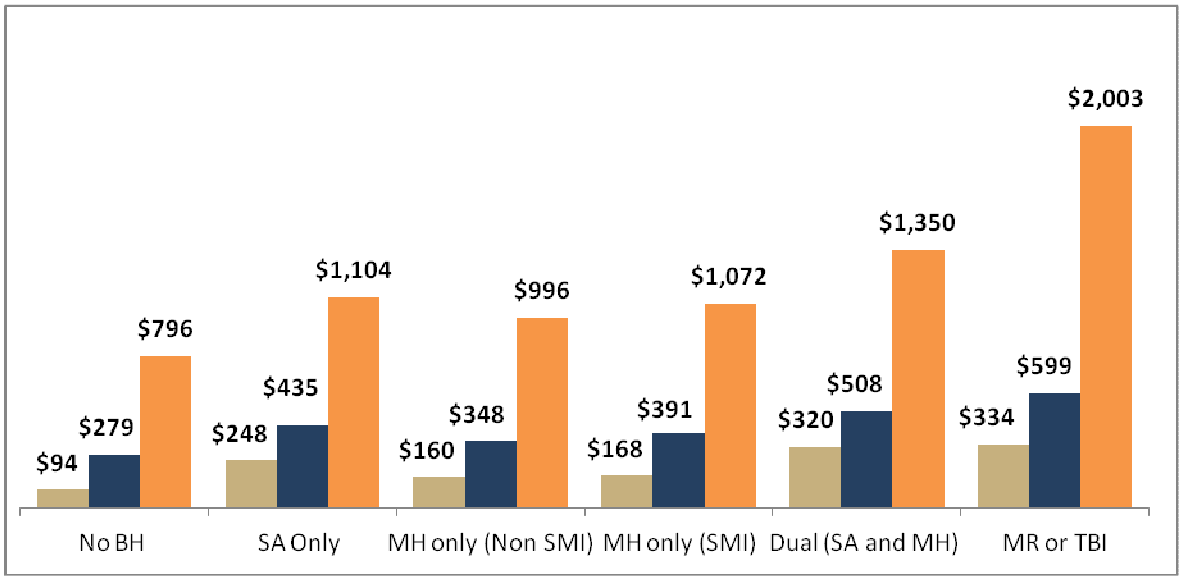
FIGURE 2. Per Member Per Month Costs increase with behavioral health and number of other chronic conditions



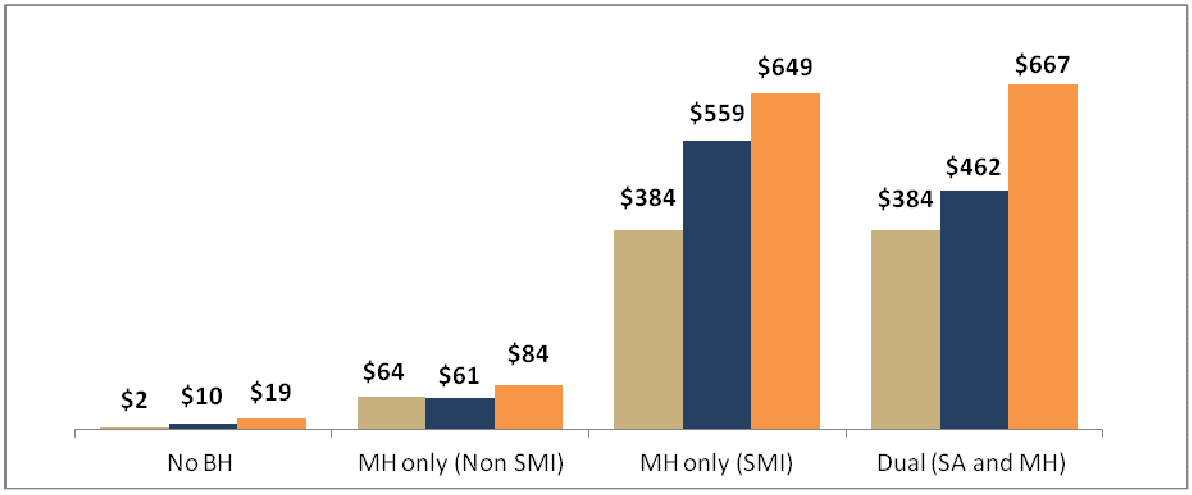
As shown in Figures 3a and 3b, medical/surgical costs are significantly impacted by behavioral health status, and behavioral health costs can be heavily influenced by presence of medical (non-behavioral health) co-morbidities.

Figure 3. PMPM (Per Member Per Month) Cost in Relation to Number of Medical Co-Morbidities (0 or 1, 2 or 3, 4 or more) and Behavioral Health Status

(a) Medical/Surgical PMPM



(b) Behavioral Health PMPM



Results of our linear regression analyses on cost outcomes are shown in Table 1. We first regressed the full set of independent variables on each type of cost – total cost, behavioral health cost, and medical/surgical cost. We then repeated the analyses, omitting the 5 behavioral health classification

variables in order to determine the contribution of behavioral health variables to explanation of cost variation.

As shown in Table 1, our 13 independent variables –3 demographic, 5 behavioral health, 3 chronic medical, and 2 physician relationship – were able to account for 50.2% of the variation in total costs in our population of 61,433 persons.[†]

The baseline for these analyses included patients who were (a) 18-44 years old, (b) female, (c) living in a non-micropolitan area, (d) with no behavioral health diagnosis, (e) with no more than one major chronic condition, and who (f) had a PCP relationship, and (g) did not receive fragmented care. With this baseline, the most important single contributor to a patient's total cost is a diagnosis of cognitive impairment (MR, DD, or TBI) (coefficient = 2.201), and the second most important contributor is also a BH variable, having dual diagnosis substance abuse/mental illness (MH/SA) (coefficient = 1.682). Each of these variables contributes more to total cost than any of the demographic variables, than either of the PCP relationship variables, and more even than the presence of 4 or more chronic medical conditions. Two other BH variables – serious mental illness only, and substance abuse only – each contribute more to cost than the any of the demographic variables or PCP relationship variables, and more even than the presence of 3 chronic medical conditions. Regression of the non-BH variables – demographics, chronic medical conditions, and PCP relationships – on total costs yielded an R^2 value of .300, indicating that as a group the BH variables account for 40% of overall total cost variance explanation. It must be recognized, however, that this high percentage may not be generalizeable beyond the long term Medicaid population being studied.

TABLE 1. Explaining Variation in Log Costs: Total, Behavioral Health, and Medical: All Cases

Variable	Total Costs (n=61,433)		Behavioral Health (BH) Costs (n=39,728)		Medical/Surgical (non BH) Costs (n-61,433)	
	BH Costs Included	BH Costs Not Included	BH Costs Included	BH Costs Not Included	BH Costs Included	BH Costs Not Included
Intercept	4.482 ***	4.951 ***	0.814 ***	2.97 ***	4.477 ***	4.71 ***
Age 45-65	-0.008 NS	-0.106 ***	0.062 *	-0.208 ***	0.004 NS	-0.055 ***
Male	-0.347 ***	-0.293 ***	0.081 **	0.428 ***	-0.471 ***	-0.436 ***
MH Only SMI	1.392 ***		4.225 ***		0.474 ***	
MH Only Non SMI	0.686 ***		2.071 ***		0.359 ***	
Substance Abuse (SA) Only	1.321 ***		2.934 ***		0.832 ***	
Dual (MH and SA)	1.682 ***		4.182 ***		0.947 ***	
MR, DD, or TBI	2.201 ***		4.92 ***		0.955 ***	
2 MCCs	0.633 ***	0.785 ***	0.079 ***	0.169 ***	0.714 ***	0.783 ***
3 MCCs	0.874 ***	1.095 ***	0.226 ***	0.401 ***	0.984 ***	1.085 ***
4 or More MMCs	1.401 ***	1.812 ***	0.355 ***	0.82 ***	1.663 ***	1.843 ***
Micropolitan	0.11 ***	0.233 ***	0.171 ***	0.458 ***	0.051 ***	0.107 ***
No PCP	-0.468 ***	-0.614 ***	-0.075 **	-0.144 ***	-0.505 ***	-0.576 ***
Fragmented PCP	0.188 ***	0.332 ***	-0.002 NS	0.258 ***	0.247 ***	0.322 ***

[†]Note that our analyses are "estimation", not "validation" analyses. For validation analyses, a model is fit in one data set (the estimation set) and then tested in a second, independent data set (the validation set). In general, validation R^2 values are lower than estimation R^2 values.

Adjusted R Square	0.502	0.300	0.471	0.029	0.412	0.356

*** significant ≥ .0001
** significant ≥ .01
* significant ≥ .05
NS not significant

In our Medicaid population of 61,433 persons, the full set of independent variables is able to explain 41.2% of the variation in medical/surgical costs. Not surprisingly, presence of 4 or more MCCs is the most important predictor of costs (coefficient = 1.663), and presence of 3 MCCs is second (coefficient = .984). However, we also find that 3 of the 5 BH variables – MR/DD/TBI; Dual MH/ SA; and SA only – each contribute more to medical/surgical costs than presence of 2 MCCs, and considerably more than any of the demographic or PCP relationship variables. When BH variables are omitted from the analysis of medical/surgical costs, R^2 declines from 41.2% to 35.6%.

Our full set of independent variables is able to explain 47.1% of the variation in behavioral health costs for the 39,728 persons who have one or more BH diagnoses. In this analysis, PCP relationship variables are less important (one significant at p ≥ .01, the other not significant), as are demographic variables (one significant at p ≥ .05, another at p ≥ .01). It is not surprising that BH variables are more important in explaining variation in BH costs than any of the other independent variables considered. However, the magnitude of the difference is interesting. Even the least important BH variable, substance abuse only (coefficient = 2.934), has an effect on behavioral health costs that is more than 8 times greater than the next most important non-BH independent variable in the analysis (4 or more MCCs, coefficient = .355). In the analysis of BH costs with BH variables omitted, R^2 is only .02

3. Utilization of Services

Major Finding:

- **All medical/ surgical utilization (emergency room use, hospital admission and readmission, hospital days, outpatient primary care and specialty visits are increased in those with behavioral health disorders.**

As an example, the average number of emergency department visits is increased 1.73 times for the behavioral health groups over the no behavioral health groups, as follows: No behavioral health diagnosis (1.5 ED visits/year), SA only (2.5 ED visits/year), non SMI MH (2.7), SMI (3.5), dual diagnosis MH/SA (4.8), and MR/DD/TBI (5.3). The primary diagnosis for more than 95% of visits is medical or surgical, not behavioral health.

4. Access to Primary Care: a critical system factor

Current thinking about how best to improve health outcomes for persons with chronic medical conditions, e.g. the Wagner Care Model, stresses the importance of patient and provider being engaged in a continuous, collaborative relationship. Maine's measure of Fragmented Care is based on work by Liu

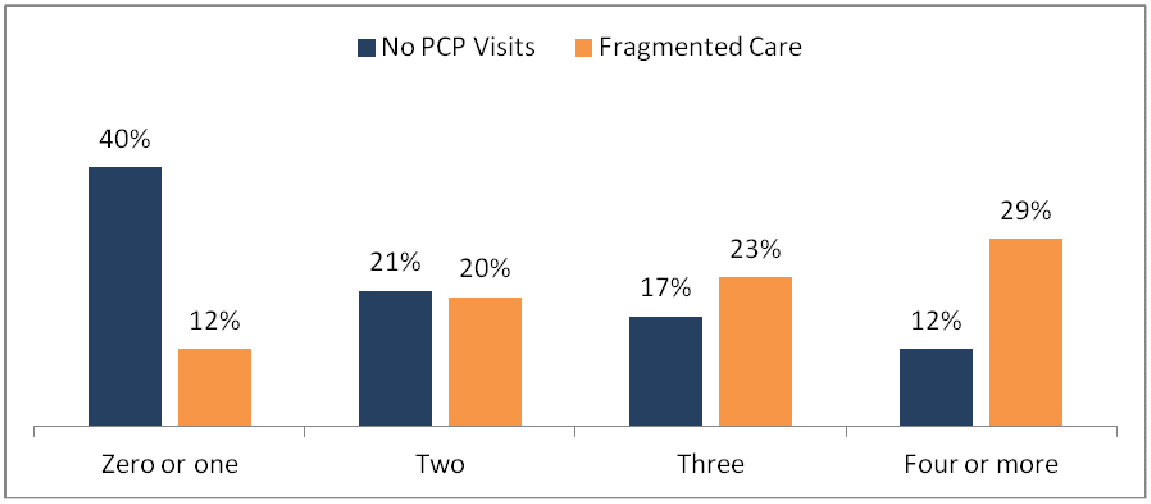
et al[22] which calculates a continuity of care(COC) measure that considers the total number of visits to primary care practices (PCP), the number of different PCP practices, and the number of visits to each practice. The COC runs from 0 (continuous care-all visits to the same PCP) to 1 (each visit takes place at a different PCP site. Persons were ranked base on COC score with those above the 75th percentile considered to have fragmented care.

Main Findings:

- **A significant portion of the cohort, including those with diabetes and multiple medical co-morbidities, has no visits to any primary care provider in the 2 year baseline.**
- **Fragmentation of Primary Care (utilization of different primary care practices) is higher among the various behavioral health groups, those with multiple medical co-morbidities and those with more complicated diabetes.**
- **Fragmented primary care is associated with 25% higher medical/surgical costs and higher utilization of services, e.g. 16% higher emergency room use.**

Lack of visits to a PCP is higher among persons with no BH disorder and those with SA only (39%), twice the prevalence of those with mental illness or cognitive impairments (19-21%). Complexity appears related to an individual's seeking PCP care, with 40% of those with zero or only one chronic medical co-morbidity lacking any PCP care, compared to 12%, 17% and 21% of those with 4 or more, 3 or 2 chronic medical conditions. Complexity similarly appears related to fragmentation of primary care, with increased levels of fragmentation among more complex populations. 29% of persons with diabetes with complications have fragmented care compared to 21% of those with no complications. 20-26% of those with Mental Illness, dual diagnosis MH/SA or cognitive impairments have fragmented care compared to 12% of those with no BH disorder, and the prevalence of fragmented PCP care increases step wise with the number of chronic medical co-morbidities.

FIGURE 4. Access to Primary Care by Number of Other Chronic Conditions



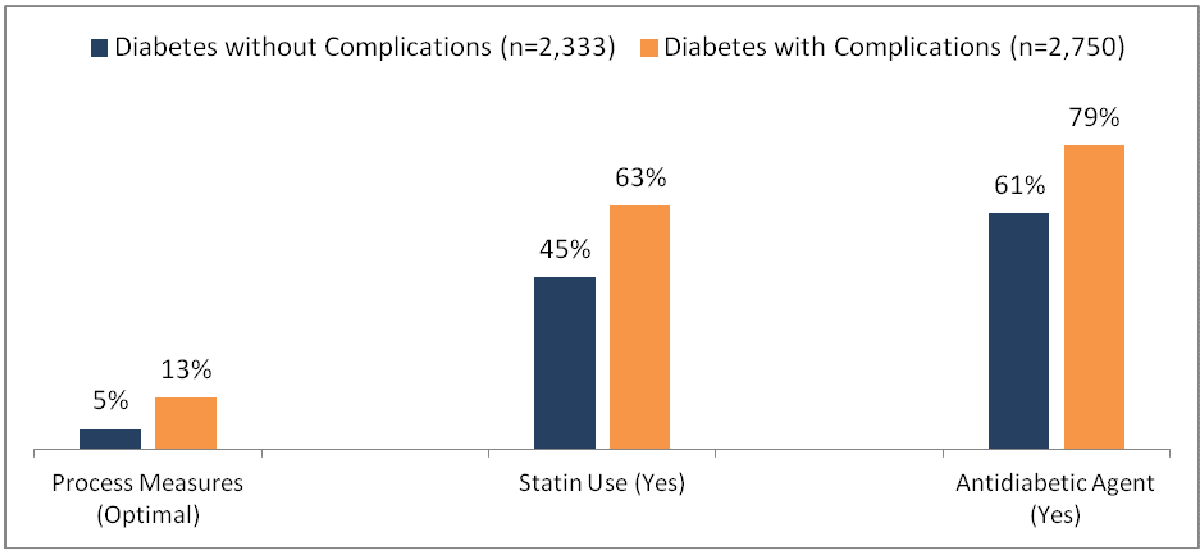
Fragmentation of PCP care is also associated with worse diabetes outcomes. Having fragmented care increases the likelihood of having complications of diabetes by 28% at baseline, and having fragmented care at baseline increases the likelihood of developing worse diabetes in the follow-up years by 63%. There is change in the level of fragmentation over time, and these changes are also associated with changes in outcomes. For example, persons who move from fragmented to continuous care in follow-up are 25% less likely to develop a new diagnosis of diabetes, while those that move from continuous care at baseline to fragmented care in follow-up are 15% more likely to develop diabetes. It appears likely that improvement in continuity of care should lead to improved outcomes, but what is less clear is whether fragmentation is a function of systemic factors at the PCP practice level, or patient factors, or both, and what might be done to improve continuity of care.

5.ACCESS TO EVIDENCE BASED DIABETES CARE: TOO LITTLE, TOO LATE?

American Diabetes Association guidelines set standards for optimal care for those with diabetes. Only some of these standards can be obtained from services data. The interventions chosen for this analysis are the following 5 tests: Hemoglobin A1C two or more times per year; screening for renal disease (serum creatinine and urinary albumin), lipids, eye exam. Since the 5 baseline measures should have occurred over two years, we defined optimal process measures as having 8-10 interventions, moderate as 4-7, and poor as 0-3 interventions. We also measured receipt of statins and receipt of glucose lowering medications. In this study, there were no significant differences by behavioral health groups in receipt of these interventions; indeed in many instances those with BH disorders had higher levels of interventions.

Delivery of interventions was significantly higher, although hardly at optimal levels, in those who already had developed complications of diabetes, than among those who had uncomplicated diabetes. During the follow-up period, which was relatively short, receipt of these interventions was predictive of developing worse diabetes, rather than being preventive.

FIGURE 5. Lost Opportunity for Prevention: ADA Recommended Process Measures Lower in Persons with Uncomplicated Diabetes


Diabetes without Complications (n=2,333)
Diabetes with Complications (n=2,750)
5%
13%
45%
63%
61%
79%
Process Measures (Optimal)
Statin Use (Yes)
Antidiabetic Agent (Yes)

6. Follow-up Years: Worse diabetes

Main Findings:

- **Persons with BH disorders are more likely to develop worse diabetes in follow-up years.**
- **Change in BH status during follow-up years affects the likelihood of developing worse diabetes.**
- **Fragmentation of primary care is associated with developing more complications in follow-up.**
- **Change from fragmented to continuous care protects against developing worse diabetes in the follow-up years.**

Worse diabetes was defined as developing any complications for those with uncomplicated diabetes, or developing more complications for those with complicated diabetes at baseline. While the magnitude of the effect of any one factor differed between the those who had complicated or uncomplicated diabetes at baseline, the following were significant for both groups: 4 or more non-diabetes chronic medical conditions at baseline; co-morbid mental illness/substance abuse; Serious Mental Illness; decline in mental health status; older age; and change from continuous to fragmented care. For both groups, change from fragmented to continuous care and improved mental health status were protective of developing worse diabetes.

We also examined the factors predicting death among those with diabetes. Not surprisingly increased risk of death was greatest for the following: four or more non-diabetes related medical comorbidities (225% increased risk); acute diabetic event in follow-up (223%); chronic diabetes complications (216%) and older age (129%). Additionally, two behavioral health variables were significant in predicting risk of death for those with diabetes: antipsychotic use (116% increased risk) and decline in mental health status (73% increased risk).

7. Follow-up Years: New onset diabetes

Main Findings:

- **Persons with mental illness and co-morbid mental illness/substance abuse develop new onset diabetes at higher rates than those with no BH disorders**
- **Long term receipt of antipsychotic medications is associated with higher likelihood of developing diabetes in persons with BH disorders**
- **Even among persons with high risk for diabetes or pre-diabetes, interventions to prevent progression to diabetes occur at low rates**

Persons with Serious Mental Illness have the highest rate of developing a new diagnosis of diabetes (47.7/1000), followed by those with non-SMI mental illness (38.6/1000) and dual diagnosis MH/SA (34.7/1000), all higher than among those with no BH disorder (29.8/1000). Persons who receive long term antipsychotic medications are 73% more likely to develop a new diagnosis of diabetes. Other

factors that predict increased risk of developing diabetes in follow-up include the following: two or more non-diabetes chronic medical conditions (defined as those chronic conditions that are not a complication of diabetes) or an increase in the number of those medical conditions; presence at baseline of those chronic medical conditions that are also complications of diabetes, e.g. cardiovascular disease; having pre-diabetes at baseline; and moving from continuous to fragmented care. Moving from fragmented to continuous care decreases risk by 25%.

Who in the baseline cohort is defined as having pre-diabetes consisted primarily of persons with an ICD-9 diagnosis of dysmetabolic syndrome or having a prescription for metformin or having a diagnosis of dyslipidemia and obesity and hypertension. Even among this high risk group, only 28% had both annual monitoring for lipid and glucose, 26% had receipt of statins, and 24% were on metformin, suggesting that overall there is a long way to go in delivery of evidence based interventions that should lead to prevention of new onset diabetes.

8.Follow-up Years: Death

Main Findings:

- **Persons with behavioral health disorders die at a higher rate.**
- **Among persons with behavioral health disorders, receipt of antipsychotics is a significant predictor of death**

875 persons in the cohort died by 2011, the end of the study period. Death rates varied by behavioral health status, with the lowest rates for those with no BH diagnosis (8.3/1000). The highest rate (43.5/1000) was for persons with cognitive impairments. Substance abuse was a major risk for death, with rates of 27.9/1000 and 20.6/1000 for persons with dual diagnosis and substance use only respectively. Persons with Serious Mental Illness also died at a higher rate (13.0/1000). Factors predicting increased risk of death in the baseline cohort include the following: two, three or 4 plus chronic medical conditions (50%, 115% and 240% increased risk respectively); Cognitive Impairments (157%); co-morbid Mental Illness/Substance Abuse (110%); Substance Abuse only (97%). When controlling for BH status antipsychotic use remains a significant predictor of death with an 89% greater risk among those who receive antipsychotics in the baseline period.

Discussion

This study points to the importance of taking a person centered, rather than a disease specific approach, especially for Medicaid populations, who have high rates of both chronic medical conditions and behavioral health disorders. Further study is necessary to understand to what degree the findings in this study can be generalized to other populations, e.g. those with commercial insurance, or to populations in other states. However, given the increasing interest in new systems of care delivery and financing, points to consider include the following: 1) Can cost savings and improved population health be realized without integration of behavioral health into system transformation and what is the timing of that integration? 2) Will increased utilization of BH services offset cost savings from reduced utilization of medical care? 3) Are these populations seeking more care from more providers because

they are doing worse medically than their peers without behavioral health disorders? 4) Are they doing worse only because of a lack of access to BH care that might support improved BH status or might there be biological or other factors influencing their outcomes? 5) Will a more intense application of interventions based on current knowledge suffice for these populations or do they require the development of new interventions tailored more specifically to their complex needs?

LIST OF PUBLICATIONS AND PRODUCTS

- Maine MCC project website: http://www.mainemcc.org/
- Maine DHHS Office of Continuous Quality Improvement Services: *When Might the Risks Outweigh the Benefits in Prescribing Antipsychotics to MaineCare Members?*, 2012. QI Data Snapshot, Vol 4, Issue 3. http://www.maine.gov/dhhs/QI/snaphots/Volume-4-Issue-3.pdf
- Freeman E, McGuire C, Thomas, JW *Integration of Health Care in Maine: Implications From the Multiple Chronic Conditions Project,* Augusta, ME, Sept. 2012 http://www.mainemcc.org/media/files/Integration%20of%20Health%20Care%20in%20Maine_MCC%20Forum_092112.pdf
- Freeman, E *Factors affecting cost and utilization for long term MaineCare members: Fragmentation of Care*, Portland, ME, Sept. 2012 http://www.mainemcc.org/media/files/Fragmentation%20of%20Care%20webinarpresentation%20FINAL%281%29.pdf

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Evaluation Development & Implementation Workplan - Draft 6/25/2013	2013				2014				2015				2016
	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)
Work Activities													
Evaluation & Performance Reporting Infrastructure Development													
Develop RFP for Evaluation Contractor	✓												
Identify Evaluation and execute a contract for the work		✓											
Identify committee members and convene Evaluation and Performance Reporting Committee			✓										
Identify expert consultants to assist with metric development, study design and analytics			✓										
Identify potential research partners to participate in Innovation Model Research Collaborative			✓	✓									
Develop and implement operational plan for research collaborative				✓	✓								
Convene meeting of Research Collaborative Partners					✓								
Develop and execute necessary MOU's and data use agreements between the Local Evaluator, the State and other Innovation Partner organizations				✓									
CMMI Cross-Site Evaluation Design and Implementation													
Work with CMMI to identify core measures and data sources for use in the cross-site evaluation		✓	✓										
Work with CMMI to Develop standardized data collection, reporting, and data quality control protocols for evaluation .			✓	✓									
Work with CMMI to develop and test a standard process for rapid cycle continuous improvement				✓	✓								
Work with CMMI on data specification and data transfer protocols for required analytic data sets to be transmitted to CMMI Evaluation Team			✓	✓									
Implement data collection for Cross-Site Model Implementation and Impact evaluation components					✓	✓	✓	✓	✓	✓	✓	✓	✓
Prepare and transmit required analytic/evaluation data sets to CMMI Evaluation Team (Data transmitted at 6 month intervals)													
Implement rapid cycle continuous improvement process on targeted improvement priorities					✓		✓		✓		✓		✓

Evaluation Development & Implementation Workplan - Draft 6/25/2013	2013				2014				2015				2016
	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)
Work Activities													
Local Evaluation Design and Implementation													
Review and refine Evaluation Logic Model with Innovation Model partners and Stakeholders		✓											
In consultation with project communications team, prepare an evaluation brochure and distribute to PCP's and Project Stakeholders			✓										
Research and identify core process of care and clinical/quality measures and instruments for use in evaluation	✓	✓	✓										
Develop study design, data collection, and analytics plan for local Implementation study		✓	✓										
Develop study design, data collection, and analytics plan for economic/cost study		✓	✓										
Develop study design, data collection, analytic plan for the impact/effectiveness study to test the effectiveness of Innovation Model interventions		✓	✓	✓									
Review draft evaluation plans with the Evaluation and Performance Reporting Workgroup and SIM Steering Committee and revised accordingly			✓										
Review and obtain approval for evaluation plan from CMMI			✓										
Develop informed consent procedures/protocols and obtain Institutional Review Board (IRB) approval for planned studies			✓	✓									
Pilot test implementation study focus group/interview protocols and refine				✓									
Implement data collection for local evaluation studies					✓	✓	✓	✓	✓	✓	✓	✓	✓
Develop data specifications and prepare analytic data sets for use in Implementation and Impact Study components													
Perform data analysis for Implementation and Impact Study components				✓	✓								
Prepare annual reports for evaluation findings and disseminate to project stakeholders								✓				✓	✓
Prepare Quarterly Evaluation Highlights Newsletter and distribute to project stakeholders				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Prepare one or more papers for submission to peer reviewed journals documenting evaluation findings								✓				✓	✓
Performance Measurement, Reporting and Continuous Improvement Monitoring													
Review and identify core performance metrics for use in performance reporting and continuous improvement monitoring		✓											
Establish baselines and performance targets on identified performance measures		✓	✓	✓									
Design performance report templates for feedback to participating Primary care and behavioral health providers and other audiences			✓	✓									
Develop procedures/protocols for performance reporting, continuous improvement planning and translation of research into practice		✓	✓										

Evaluation Development & Implementation Workplan - Draft 6/25/2013	2013				2014				2015				2016
	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)	QTR 2 (Oct-Dec)	QTR 3 (Jan-Mar)	QTR 4 (Apr-Jun)	QTR 1 (Jul-Sep)
Work Activities													
Develop and implement monthly performance monitoring reports to PCP's and behavioral health providers					✓	✓	✓	✓	✓	✓	✓	✓	✓
Develop web-based performance dashboard for provider and public reporting				✓	✓								
Implement quarterly performance reporting and targeted CQI process with participating primary care and behavioral health providers					✓	✓	✓	✓	✓	✓	✓	✓	✓

Section S. Fraud and Abuse Prevention, Detection, and Correction

Refer to DRR Section S: Fraud and Abuse Prevention, Detection and Correction

Supporting Documentation Available:

S1) Website for regulations cited: http://www.gpo.gov/fdsys/pkg/CFR-2009-title42-vol4

Section T. Risk Mitigation Strategies

Refer to DRR Section T: Risk Mitigation Strategies

Supporting Documentation Available:

T1) SIM Risk Log Template

Risk Workgroup	**Risk Name**	**IF….**	**THEN…**	**Category**	**Dimension(s)**	**Risk Owner** (Project Manager Name)	**Priority**	**Status:**	**Creator** (Originator)	**Date created**	**Updated by** (name)	**Date last updated**	**Probabiliy 1-5**	**Impact 1-5**	**Calculated risk**	**Risk Details -** (free form) **-** can capture additoinal descriptive info or any updates	**Risk Symptoms -** (free form)	**Mitigation plan** (free form)	**Impact Description** (free form) - detailed description of impact risk will have on the project / program / release - further detail for "then"	**Impact Category**	**Impact Date**	**Primary Domain Impacted** (choose from list of domains in Clarity)	**Release / Program Impacted**	**Associated Risks**
															0									
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Associated Issues