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**The Outcomes of Implementing Patient-Centered Medical Home Interventions:
A Review of the Evidence on Quality, Access and Costs
from Recent Prospective Evaluation Studies
August, 2009**

Abundant research comparing nations, states and regions within the US, and specific systems of care has shown that health systems built on a solid foundation of primary care deliver more effective, efficient, and equitable care than systems that fail to invest adequately in primary care.^{1,2} However, some policy analysts have questioned whether these largely cross-sectional, observational studies are adequate for making inferences about whether implementing major policy interventions to strengthen primary care as part of health reform would in the relatively short term “bend the cost curve” at the same time as improving quality of care and patient outcomes.

Is there research using prospective, controlled study designs which shows what happens to quality, access and costs as a result of investments to enhance and improve primary care? Have recent evaluations documented the outcomes of interventions in the US promoting primary care Patient-Centered Medical Homes?

The answer to these questions is, Yes. Although some major evaluations of the Patient-Centered Medical Home are only now getting off the ground, including the evaluation of the Medicare Medical Home Demonstrations, evaluations of other primary care initiatives are much farther along, and the findings of some of these evaluations are starting to emerge in peer-reviewed journals and other publications.

This briefing document summarizes key findings from recent Patient-Centered Medical Home evaluation studies. These studies have investigated a variety of PCMH models, in a variety of settings ranging from integrated delivery systems to community-based office practices. Some evaluations examine interventions focused on general primary care patient populations, and others on high risk subsets. The evaluations span privately insured patients, Medicaid, SCHIP and Medicare beneficiaries, and the uninsured.

Across these diverse settings and patient populations, evaluation findings consistently indicate that investments to redesign the delivery of care around a primary care patient-centered medical home yield an excellent return on investment:

- **Quality of care, patient experiences, care coordination, and access are demonstrably better.**
- **Investments to strengthen primary care result within a relatively short time in reductions in emergency department visits and inpatient hospitalizations that produce savings in total costs. These savings at a minimum offset the new investments in primary care in a cost-neutral manner, and in many cases appear to produce a reduction in total costs per patient.**

This report provides a review of recent Patient-Centered Medical Home evaluations. The initial section of the report provides a concise summary of the key data on cost outcomes. The subsequent section provides more information about each Patient-Centered Medical Home model and includes data on quality and access in addition to costs, as well as reference citations.

1. Summary of Key Data on Cost Outcomes from Patient-Centered Medical Home Interventions

Group Health Cooperative of Puget Sound

- 29% reduction in ER visits and 11% reduction in ambulatory sensitive care admissions.
- Additional investment in primary care of \$16 per patient per year was associated with offsetting cost reductions, with the net result being no overall increase in total costs for pilot clinic patients (the total net cost trend was a savings of \$17 per patient per year, which was not statistically significant). Unpublished data from the 24 month evaluation reportedly show a statistically significant decrease in total costs.

Community Care of North Carolina

- 40% decrease in hospitalizations for asthma and 16% lower ER visit rate; total savings to the Medicaid and SCHIP programs are calculated to be \$135 million for TANF-linked populations and \$400 million for the aged, blind and disabled population.

HealthPartners Medical Group BestCare PCMH Model

- 39% decrease in emergency room visits, 24% decrease in hospital admissions
- Overall costs in the PCMH clinics decreased from being 100% of the state network average in 2004 to 92% of the state average in 2008, in a state with costs already well below the national average

Geisenger Health System ProvenHealth Navigator PCMH Model

- Statistically significant 14% reduction in total hospital admissions relative to controls, and a trend towards a 9% reduction in total medical costs at 24 months.
- Estimated \$3.7 million net savings, for a return on investment of greater than 2 to 1.

Genesee Health Plan HealthWorks PCMH Model

- 50% decrease in ER visits and 15% fewer inpatient hospitalizations, with total hospital days per 1,000 enrollees now cited as 26.6 % lower than competitors.

Colorado Medicaid and SCHIP

- Median annual costs \$785 for PCMH children compared with \$1,000 for controls, due to reductions in ER visits and hospitalizations. In an evaluation specifically examining children in Denver with chronic conditions, PCMH children had lower median costs (\$2,275) than those not enrolled in a PCMH practice (\$3,404).

Intermountain Healthcare Medical Group Care Management Plus PCMH Model

- 10% relative reduction in total hospitalizations, with even greater reductions among the subset of patients with complex chronic illnesses. Net reduction in total costs \$640 per patient per year (\$1,650 savings per year among highest risk patients).

Johns Hopkins Guided Care PCMH Model

- 24% reduction in total hospital inpatient days, 15% fewer ER visits, 37% decrease in skilled nursing facility days
- Annual net Medicare savings of \$1364 per patient and \$75,000 per Guided Care nurse deployed in a practice

2. Full Summaries of Patient-Centered Medical Home Interventions and Outcomes

Group Health Cooperative of Puget Sound

Group Health Cooperative of Puget Sound, a large, consumer owned integrated delivery system in the Northwest, is rolling out a major transformation of its primary care practices. In 2007, Group Health piloted a Patient Centered Medical Home redesign at one of its Seattle clinic sites. The redesign included substantial workforce investments to reduce primary care physician panels from an average of 2,327 patients to 1,800, expand in-person visits from 20 to 30 minutes and use more planned telephone and email virtual visits, and allocate daily “desktop medicine” time for staff to perform outreach, coordination, and other activities. The redesign emphasized team-based chronic and preventive care and 24/7 access using modalities including EHR patient portals.

A 12 month controlled evaluation of the pilot clinic redesign, published in a peer-reviewed journal,³ found the following:

- Better quality: the pilot clinic had an absolute increase of 4% more of its patients achieving target levels on HEDIS quality measures, significantly different from the control clinic trend; pilot clinic patients also reported significantly greater improvement on measures of patient experiences, such as care coordination and patient activation.
- Better work environment: Less staff burnout, with only 10% of pilot clinic staff reporting high emotional exhaustion at 12 months compared to 30% of staff at control clinics, despite being similar at baseline; Group Health has seen a major improvement in recruitment and retention of primary care physicians.
- Reduction in ER and inpatient hospital costs: 29% reduction in ER visits and 11% reduction in ambulatory sensitive care admissions.
- Better value proposition: an additional investment in primary care of \$16 per patient per year was associated with offsetting cost reductions, with the net result being no overall increase in total costs for pilot clinic patients (the total net cost trend was a savings of \$17 per patient per year, which was not statistically significant). Unpublished data from the 24 month evaluation reportedly show a statistically significant decrease in total costs.

As a result of the success of the pilot clinic redesign, Group Health is currently implementing the PCMH model at all 26 of its primary care clinics serving 380,000 patients.

Community Care of North Carolina

Community Care of North Carolina has more than a decade of experience with innovations in the delivery of primary care to Medicaid and SCHIP beneficiaries. Community Care linked these beneficiaries to a primary care medical home, provided technical assistance to practices to improve chronic care services, directly hired a cadre of nurses to collaborate with practices in case management of high risk patients, and added a \$2.50 (now \$3.00) per member per month care coordination fee for each patient registered with the practice, contingent on practices reporting clinical tracking data. The Community Care PCMH program now involves more than 1,300 community-based practice sites with approximately 4,500 primary care clinicians throughout North Carolina.

An external evaluation^{4 5} concluded that the Community Care of North Carolina PCMH model resulted in:

- Better quality: 93% of asthmatics received appropriate maintenance medications; diabetes quality measured improved by 15%
- Lower costs: 40% decrease in hospitalizations for asthma and 16% lower ER visit rate; total annual savings to the Medicaid and SCHIP programs are calculated to be \$135 million for TANF-linked populations and \$400 million for the aged, blind and disabled population.

HealthPartners Medical Group

HealthPartners Medical Group, a 700 physician group that is part of a consumer-governed health organization in Minnesota, implemented a Patient Centered Medical Home model in 2004 as part of its "BestCare" model of delivery system redesign. The BestCare model invested in better care coordination centered in the primary care medical home, including proactive chronic disease management through phone, computer, and face-to-face coaching. The program also emphasized more convenient access to primary care through online scheduling, test results, email consults, and post-visit coaching.

A 5 year prospective evaluation of the Patient Centered Medical Home approach used in the HealthPartners BestCare model, as reported by the Institute for Healthcare Improvement,⁶ found the following results:

- Better quality: 129% increase in patients receiving optimal diabetes care, 48% increase in patients receiving optimal heart disease care
- Better access: 350% reduction in appointment waiting time
- Reduction in ER and inpatient hospital costs: 39% decrease in emergency room visits, 24% decrease in admissions
- Overall costs in the BestCare clinics decreased from being equal to the state network average in 2004 to 92% of the state average in 2008, in a state with costs already well below the national average.

Geisenger Health System ProvenHealth Navigator PCMH Model

The Geisenger Health System, a large integrated delivery system in Pennsylvania, implemented a Patient Centered Medical Home redesign in 11 of its primary care practices beginning in 2007. Their ProvenHealth Navigator model focuses on Medicare beneficiaries, emphasizing primary care-based care coordination with team models featuring nurse care coordinators, EHR decision-support, and performance incentives.

Two year follow-up results from an as yet unpublished controlled evaluation⁷ show:

- Better quality: Statistically significant improvements in quality of preventive (74.0% improvement), coronary artery disease (22.0%) and diabetes care (34.5%) for PCMH pilot practice sites.
- Reduction in costs: statistically significant 14% reduction in total hospital admissions relative to controls, and a trend towards a 9% reduction in total medical costs at 24 months.

Geisenger estimates a \$3.7 million net savings from the implementation of its PCMH model, for a return on investment of greater than 2 to 1, and is spreading the ProvenHealth Navigator PCMH model throughout the Geisenger Health System.

Genesee Health Plan

The Genesee Health Plan based in Flint, Michigan developed a Patient Centered Medical Home model for its health plan serving 25,000 uninsured adults. The Genesee PCMH model, called Genesys HealthWorks, invested in a team approach to improve health and reduce costs, including a Health Navigator to work with primary care clinicians to support patients to adopt healthy behaviors, improve chronic and preventive care, and provide links to community resources.

A 4 year longitudinal evaluation of the Patient Centered Medical Home approach used in the Genesys HealthWorks model, as reported by the Institute for Healthcare Improvement,⁸ found the following results:

- Improved access: 72% of the uninsured adults in Genesee County now identify a primary care practice as their medical home
- Better quality: 137% increase in mammography screening rates; 36% reduction in smoking and improvements in other healthy behaviors

- Reduction in ER and inpatient costs: 50% decrease in ER visits and 15% fewer inpatient hospitalizations, with total hospital days per 1,000 enrollees now cited as 26.6 % lower than competitors.

Colorado Medicaid and SCHIP

The Colorado Department of Health Care Policy and Financing has implemented a Patient-Centered Medical Home program for low income children enrolled in the state's Medicaid and SCHIP programs. To qualify as Medical Homes, primary care practices must have 24/7 access, open access systems or similar convenient scheduling of appointments, and provide care coordination, which make practices eligible for extra pay for performance payments indexed to EPSDT metrics. As of March 2009, 150,000 children were enrolled in Colorado PCMH practices, involving 97 different community-based practices and 310 physicians.

The Colorado Department of Health Care Policy and Financing has performed an internal evaluation of its PCMH program,⁹ comparing children in PCMH practices to those care for in usual care practices, and found:

- Better quality: 72% of children in the PCMH practices have had well-child visits, compared with 27% of controls.
- Lower costs: Median annual costs were \$785 for PCMH children compared with \$1,000 for controls, due to reductions in ER visits and hospitalizations. In an evaluation specifically examining children in Denver with chronic conditions, PCMH children had lower median costs (\$2,275) than those not enrolled in a PCMH practice (\$3,404).

Intermountain Healthcare Medical Group Care Management Plus PCMH Model

Intermountain Healthcare Medical Group, part of an integrated delivery system in Utah, began implementing a PCMH redesign model in 2001. The Care Management Plus PCMH model focuses on primary care-based care coordination of high risk elders, embedding RN care managers in primary care practices and enhancing EHR functionality in support of chronic care and care coordination.

A well-designed controlled 2 year evaluation published in peer-reviewed journals¹⁰ documented:

- Better quality: absolute reduction of 3.4% in 2-year mortality (13.1% died in PCMH group, 16.6% in controls)
- Lower costs: a 10% relative reduction in total hospitalizations, with even greater reductions among the subset of patients with complex chronic illnesses. Net reduction in total costs was \$640 per patient per year (\$1,650 savings per year among highest risk patients).

Based on these evaluation results, the Care Management Plus PCMH model is now being implemented at more than 75 practices in more than 6 states. (Dorr et al., 2007a; Dorr et al., 2008).

Johns Hopkins Guided Care PCMH Model

The Guided Care PCMH model, organized by a group at Johns Hopkins School of Medicine features care coordination by teams of RNs and primary care physicians working in community-based practices. Guided Care model RNs are trained to teach patients and families self-management skills, including early identification of worsening symptoms that can be addressed before an emergency department or hospital admission becomes necessary. The RNs focus on Medicare beneficiaries in the top quartile of health risk.

A preliminary evaluation after 8 months of a cluster randomized trial of this model involving 904 patients has been published in a peer-reviewed journal.¹¹ The trends indicate:

- 24% reduction in total hospital inpatient days
- 15% fewer ER visits
- 37% decrease in skilled nursing facility days

- Annual net Medicare savings of \$75,000 per Guided Care nurse deployed in a practice

Erie County PCMH Model

In the 1990s, Erie County, New York implemented a primary care medical home program for dual eligible Medicaid-Medicare patients with chronic disabilities, including substance abuse. A key part of the intervention was a per-member/per-month care coordination fee to primary care practices to support enhanced team-based chronic care management. An evaluation published in a peer-reviewed journal found that the intervention improved quality of care, decreased duplication of services and tests, lowered hospitalization rates, and improved patient satisfaction while saving \$1 million for every 1000 enrollees.¹²

Geriatric Resources for Assessment and Care of Elders

The Geriatric Resources for Assessment and Care of Elders (GRACE) program, situated at an urban system of community clinics affiliated with the Indiana University School of Medicine, enrolled low-income seniors with multiple diagnoses, one-fourth of whom were at high risk for hospitalization. The GRACE PCMH model included a nurse practitioner/social worker care coordination team, working closely with primary care physicians and a geriatrician. At 2 years, the use of the emergency department was significantly lower in the group receiving the GRACE intervention compared with controls. The subgroup defined at the start of the study as having a high risk of hospitalization was found to have significantly lower hospitalization rate compared with high-risk usual care patients.¹³

¹ Starfield, B., L. Shi, et al. Contribution of primary care to health systems and health. *Milbank Q* 2005;83(3): 457-502.

² Baicker K, Chandra A. Medicare spending, the physician workforce, and beneficiaries' quality of care. *Health Affairs Web Exclusive*, April 7, 2004;W4-184-197.

³ Reid R, Fishman P, Yu O et al. A patient-centered medical home demonstration: a prospective, quasi-experimental, before and after evaluation. *Am J Managed Care* 2009 (Sept issue in press).

⁴ B.D. Steiner et al, Community Care of North Carolina: Improving care through community health networks. *Ann Fam Med* 2008;6:361-367.

⁵ Mercer. Executive Summary, 2008 Community Care of North Carolina Evaluation. Available at <http://www.communitycarenc.com/PDFDocs/Mercer%20ABD%20Report%20SFY08.pdf>

⁶ Health Partners uses "BestCare" practices to improve care and outcomes, reduce costs. Institute for Healthcare Improvement. Available at <http://www.ihl.org/NR/rdonlyres/7150DBEF-3853-4390-BBAF-30ACDCA648F5/0/IHITripleAimHealthPartnersSummaryofSuccessJul09.pdf>

⁷ Geisenger Health System, presentation at White House roundtable on Advanced Models of Primary Care, August 10, 2009.

⁸ Genesys HealthWorks integrates primary care with health navigator to improve health, reduce costs. Institute for Healthcare Improvement. Available at <http://www.ihl.org/NR/rdonlyres/2A19EFDB-FB9D-4882-9E23-D4845DC541D8/0/IHITripleAimGenesysHealthSystemSummaryofSuccessJul09.pdf>

⁹ Colorado Department of Health Care Policy and Financing, Colorado Medical Home. Available at <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1239162002481&ssbinary=true>

¹⁰ Dorr DA, Wilcox AB, Brunner CP, et al. The effect of technology-supported, multidisease care management on the mortality and hospitalization of seniors. *J Am Geriatr Soc.* 2008;56(12):2195-202. Findings updated for presentation at White House roundtable on Advanced Models of Primary Care, August 10, 2009.

¹¹ Leff B, Reider L, Frick K et al. Guided care and the cost of complex health care: a preliminary report. *Am J Managed Care* 2009; 15:555-559.

¹² Rosenthal, T. C., M. E. Horwitz, et al. Medicaid Primary Care Services in New York State: Partial Capitation vs Full Capitation." *J Fam Practice* 1996;42(4):362-368.

¹³ Counsell SR, Callahan CM, Clark DO, et al. Geriatric care management for low-income seniors: a randomized controlled trial. *JAMA.* 2007;12;298(22):2623-33.