Literature Review – Chapter 4

|  |  |  |
| --- | --- | --- |
| Intervention | Total Number of Studies | Number of Review Articles |
| [**Pre-Authorization/Utilization Review**](#UR) |  |  |
| [**Concurrent Review**](#CR) |  |  |
| [**Case Management**](#CM) |  |  |
| [**Specialty Case Management**](#SCM) |  |  |
| [**Demand Management**](#DM) |  |  |
| [**Population Management**](#PM) |  |  |
| [**Disease Management**](#DM) |  |  |
| **TOTAL** |  |  |

|  |  |  |
| --- | --- | --- |
| Intervention | Total Number of Studies | Number of Review Articles |
| **[Patient Centered Medical Home (PCMH)](#PCMH)** |  |  |
| [**Accountable Care Organization (ACO)**](#ACO) |  |  |
| [**Non Traditional**](#Non) |  |  |
| [**Gaps In Care**](#GIC) |  |  |
| [**Tele Health**](#Tele) |  |  |
| [**Bundled Payment**](#BP) |  |  |
| [**Coordinated Care**](#CC) |  |  |
| **TOTAL** |  |  |

**??? Unsure which Category???**

Shoemaker, W. “The Cost of Quality: How VBP Scores Correlate with Hospital Costs.” *Health Finance Management* 66(10) (October 2012): 50 – 56.

A study sought to correlate projected total performance scores (TPSs) for hospitals under the Medicare value-based purchasing (VBP) program with routine costs as reported by each hospital for the corresponding measurement periods. The study focused on routine service costs and common departmental costs because they are generally shared among all hospitals. The study's findings suggest that these costs tend to be higher among hospitals that achieve higher levels of quality as measured by VBP scores.

**At a Glance**

* A study sought to correlate projected total performance scores (TPSs) for hospitals under the Medicare value-based purchasing (VBP) program with routine costs as reported by each hospital for the corresponding measurement periods.
* The study focused on routine service costs and common departmental costs because they are generally shared among all hospitals.
* The study's findings suggest that these costs tend to be higher among hospitals that achieve higher levels of quality as measured by VBP scores.

**[Patient Centered Medical Home (PCMH)](#PCMH)**

Carlos R. J., et al., “Patient Outcomes at 26 Months in the Patient-Centered Medical Home National Demonstration Project.” *Annuals of Family Medicine* 8(1) (2010): 557-567.

**ABSTRACT**

**PURPOSE** The purpose of this study was to evaluate patient outcomes in the National Demonstration Project (NDP) of practices’ transition to patient-centered medical homes (PCMHs).

**METHODS** In 2006, a total of 36 family practices were randomized to facilitated or self-directed intervention groups. Progress toward the PCMH was measured by independent assessments of how many of 39 predominantly technological NDP model components the practices adopted. We evaluated 2 types of patient outcomes with repeated cross-sectional surveys and medical record audits at baseline, 9 months, and 26 months: patient-rated outcomes and condition-specific quality of care outcomes. Patient-rated outcomes included core primary care attributes, patient empowerment, general health status, and satisfaction with the service relationship. Condition-specific outcomes were measures of the quality of care from the Ambulatory Care Quality Alliance (ACQA) Starter Set and measures of delivery of clinical preventive services and chronic disease care.

**RESULTS** Practices adopted substantial numbers of NDP components over 26 months. Facilitated practices adopted more new components on average than self-directed practices (10.7 components vs 7.7 components, P = .005). ACQA scores improved over time in both groups (by 8.3% in the facilitated group and by 9.1% in the self-directed group, P <.0001) as did chronic care scores (by 5.2% in the facilitated group and by 5.0% in the self-directed group, P = .002), with no significant differences between groups. There were no improvements in patient-rated outcomes. Adoption of PCMH components was associated with improved access (standardized beta [Sβ] = 0.32, P = .04) and better prevention scores (Sβ = 0.42, P = .001), ACQA scores (Sβ = 0.45, P = .007), and chronic care

scores (Sβ = 0.25, P = .08).

**CONCLUSIONS** After slightly more than 2 years, implementation of PCMH components, whether by facilitation or practice self-direction, was associated with small improvements in condition-specific quality of care but not patient experience. PCMH models that call for practice change without altering the broader delivery system may not achieve their intended results, at least in the short term.

“The Advanced Medical Home: A Patient-Centered, Physician-Guided Model of Health Care.” Philadelphia: American College of Physicians (2005)

**Executive Summary**This policy monograph highlights some of the major problems with the health care system in the United States today and proposes a fundamental change in the way that primary care and principal care are delivered and financed. It recommends voluntary certification and recognition of primary care and specialty medical practices that provide patient-centered care based on the principles of the Chronic Care Model; use evidence-based guidelines; apply appropriate health information technology; and demonstrate the use of “best practices” to consistently and reliably meet the needs of patients while being accountable for the quality and value of care provided. The American College of Physicians (ACP) introduces the term “advanced medical home” to distinguish these practices and calls for consideration and testing of this model of care. The issues identified and positions offered in this monograph address major concerns about the status of the U.S. health care system. The monograph contains the following four policy positions:

**Position 1.** ACP calls for a comprehensive public policy initiative that would fundamentally change the way that primary care and principal care (whether provided by primary care or specialty care physicians) are delivered to patients by linking patients to a personal physician in a practice that qualifies as an advanced medical home.

**Position 2**. Fundamental changes should be made in third party financing, reimbursement, coding, and coverage policies to support practices that qualify as advanced medical homes.

**Position 3.** Fundamental changes should be made in workforce and training policies to assure an adequate supply of physicians who are trained to deliver care consistent with the advanced medical home model, including internists and family physicians.

**Position 4.** Further research on the advanced medical home model and a revised reimbursement system to support practices structured according to this model should be conducted and should include national pilot testing.

**Conclusion**Donald Berwick described four levels of the U.S. health care system (43): the experience of patients (Level A); the functioning of small units of care delivery (“microsystems”) (Level B); the functioning of the organizations that house or support microsystems (Level C); and the environment of policy, payment, regulation, etc. (Level D), which influences Levels B and C. This monograph highlights the significant issues our health care system is currently facing, and will continue to experience, in Level D. Policies, payments, and the regulations that codify these processes are ill suited to the challenges outlined. The current dysfunctional physician payment system fosters an environment that is leading to declining access, accelerating costs, and mediocre quality—trends that are clearly contrary to the needs and desires of patients, physicians, and society. The current method of physician payment rewards quantity rather than quality and undervalues primary and preventive care. The current system cannot support the patient-centered care envisioned by the advanced medical care model.

The College believes that the advanced medical home model, applied in the context of a revised reimbursement system, addresses all four of Berwick’s levels.

* It will revitalize the patient–physician relationship and place the patient and his or her family at the center of care.  
    
  It will stimulate practice-level innovation to provide enhanced quality, effectiveness, safety, efficiency, and value because practices will be able to invest in systems-based care and measurement of that care.
* It will enhance coordination of care across all domains of the health care system (hospitals, home health agencies, nursing homes, consultants, and other components of our complex health care network).
* It will recognize that care provided by a personal physician, operating in accord with the advanced medical home model, is a highly valuable service.
* It will lead to the macro system changes required to support this enriched health care model (financing, coverage, reimbursement, physician education and training, and workforce distribution).

Bodenheimer,T. “North Carolina Medicaid: fruitful Payer-Practice Collaboration”. *Annals of Family Medicine* 6(4) (July/August 2008): 292- 294.

The article in this issue “Community Care of North Carolina: Improving Care Through Community Health Networks” describes a decade long program of quality improvement and cost reduction created by North Carolina Medicaid. The article provides lessons of value to all health professionals and leaders concerned with the cost and quality of care.

Lesson 1: Size Matters

Lesson 2: Improvement Take Time

Lesson 3: Collaboration Is The Key

Lesson 4: Link Patients To A Medical Home

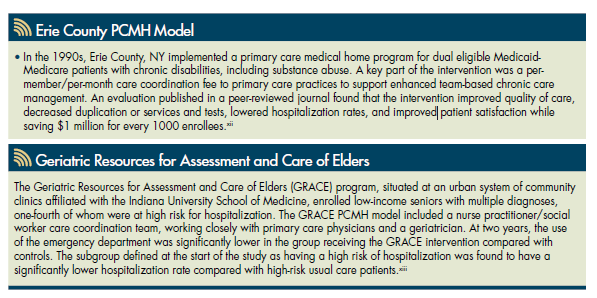
Lesson 5: Fee For Service Does Not Mix With Chronic Care

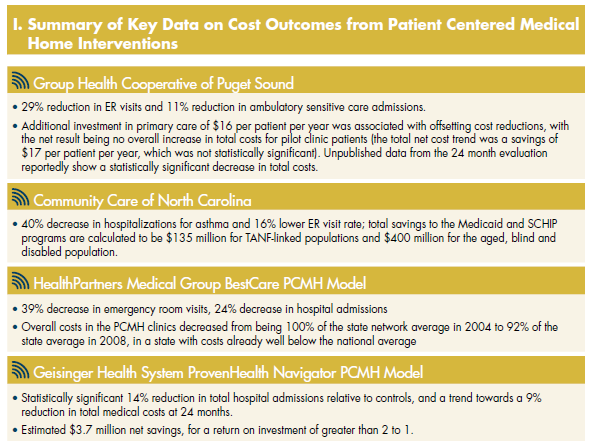
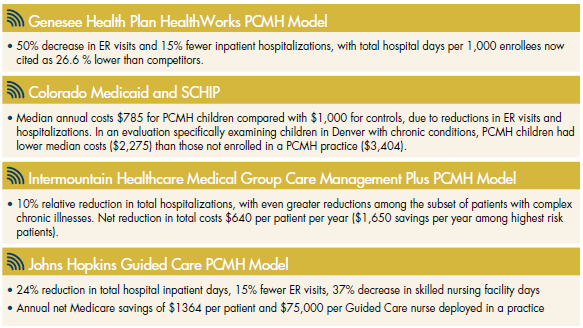
Lesson 6: Small Practices Need Support

Lesson 7: Publish Innovations

“Community Care of North Carolina: Improving Care Through Community Health Networks” is step 1 in informing the medical community of an important innovative model. I hope there will be a step 2: information (both quantitative data and qualitative interview material) from a sampling of the 1,200 practices to describe what improvements the practices have made, how widespread these improvements are, and how the clinicians in these practices view the endeavor. In the meantime, it is prudent to heed the authors’ conclusion that Community Care of North Carolina “is a model of care that has moved beyond theory and could be implemented across the country.”

Grumbach, K., et al., “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” *Patient Centered Primary Care Collaboration.*

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[Stange](http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=search&db=PubMed&term=%20Stange%20KC%5Bauth%5D), [K.C., et al.,](http://www.ncbi.nlm.nih.gov/sites/entrez?cmd=search&db=PubMed&term=%20Stange%20KC%5Bauth%5D) “Defining and Measuring the Patient-Centered Medical Home.” *Journal of General Internal Medicine.* 25(6) (June 2010): 601 - 612.

**ABSTRACT:** The patient-centered medical home (PCMH) is four things: 1) the fundamental tenets of primary care: first contact access, comprehensiveness, integration/coordination, and relationships involving sustained partnership; 2) new ways of organizing practice; 3) development of practices’ internal capabilities, and 4) related health care system and reimbursement changes. All of these are focused on improving the health of whole people, families, communities and populations, and on increasing the value of healthcare.

The value of the fundamental tenets of primary care is well established. This value includes higher health care quality, better whole-person and population health, lower cost and reduced inequalities compared to healthcare systems not based on primary care.

The needed practice organizational and health care system change aspects of the PCMH are still evolving in highly related ways. The PCMH will continue to evolve as evidence comes in from hundreds of demonstrations and experiments ongoing around the country, and as the local and larger healthcare systems change.

Measuring the PCMH involves the following:

* Giving primacy to the core tenets of primary care
* Assessing practice and system changes that are hypothesized to provide added value
* Assessing development of practices’ core processes and adaptive reserve
* Assessing integration with more functional healthcare system and community resources
* Evaluating the potential for unintended negative consequences from valuing the more easily measured instrumental features of the PCMH over the fundamental relationship and whole system aspects
* Recognizing that since a fundamental benefit of primary care is its adaptability to diverse people, populations and systems, functional PCMHs will look different in different settings.

Efforts to transform practice to patient-centered medical homes must recognize, assess and value the fundamental features of primary care that provide personalized, equitable health care and foster individual and population health.

The patient-centered medical home (PCMH) is emerging as a centerpiece of efforts to reform healthcare in the US and to establish a primary care basis for improving the value of healthcare.[1](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2869425/#CR1)–[4](http://www.ncbi.nlm.nih.gov/pubmed/19454643) In contrast to currently beleaguered US primary care,[5](http://www.ncbi.nlm.nih.gov/pubmed/16943396)–[9](http://www.ncbi.nlm.nih.gov/pubmed/19597213) what a PCMH looks like is not known outside of ongoing demonstration projects and a small number of practices that have sought to be recognized according to new standards set by the National Committee for Quality Assurance (NCQA).[10](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2869425/#CR10)–[14](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2869425/#CR14) In contrast, the benefits of primary care for people and societies are well-established.[15](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2869425/#CR15)–[19](http://www.ncbi.nlm.nih.gov/pubmed/15838088) Furthermore, the process and intended and unintended consequences[20](http://www.ncbi.nlm.nih.gov/pubmed/10511617)–[25](http://www.ncbi.nlm.nih.gov/pubmed/19336714) of transforming current practices into patient-centered medical homes are only beginning to be understood.[26](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2869425/#CR26)

Therefore, in this paper we carry out the following:

* Define the PCMH
* Compare this definition with the joint statement of PCMH principles by 4 physician organizations
* Propose principles for measuring the PCMH
* Overview current options for measuring the PCMH, including standards set by the NCQA for PCMH recognition and existing measures of primary care
* Propose relevant policy and research agendas

**CONCLUSION:** The PCMH, like primary care, is worthy of support, evaluation and evolution as a fundamental building block for a high-value health care system. In these efforts, it will be important to recognize the complex interactions of the PCMH at multiple levels, so that a narrow and short-term focus does not scuttle the potentially transformative nature of the PCMH before it has had a chance to make good upon its promise.

Nutting, P. A., et al., “Initial Lessons From the First National Demonstration Project on Practice Transformation to a Patient Centered Medical Home” *Annals of Family Medicine* 7(3) (May/June 2009): 254 - 260.

**ABSTRACT:** The patient-centered medical home (PCMH) is emerging as a potential catalyst for multiple health care reform efforts. Demonstration projects are beginning in nearly every state, with a broad base of support from employers, insurers, state and federal agencies, and professional organizations. A sense of urgency to show the feasibility of the PCMH, along with a 3-tiered recognition process of the National Committee on Quality Assurance, are influencing the design and implementation of many demonstrations. In June 2006, the American Academy of Family Physicians launched the first National Demonstration Project (NDP) to test a model of the PCMH in a diverse national sample of 36 family practices. The authors make up an independent evaluation team for the NDP that used a multimethod evaluation strategy, including direct observation, in-depth interviews, chart audit, and patient and practice surveys. Early lessons from the real-time qualitative analysis of the NDP raise some serious concerns about the current direction of many of the proposed PCMH demonstration projects and point to some positive opportunities. We describe 6 early lessons from the NDP that address these concerns and then offer 4 recommendations for those assisting the transformation of primary care practices and 4 recommendations for individual practices attempting transformation.

**RECOMMENDATIONS FOR SUPPORTING PCMH PRACTICE TRANSFORMATION:**

1. Assure Adequate Financial Resources
2. Tailor the Approach to the Practice
3. Assist Physicians With Their Personal Transformation
4. National Committee for Quality Assurance Should Modify its PCMH-Recognition Process

**PRACTICE RECOMMENDATIONS:**

1. Establish Realistic Initial Expectations for Time and Effort Required
2. Develop a Practice Technology Plan, Be Flexible ad Reflective
3. Monitor Change Fatigue
4. Learn to Be a Learning Organization

Bitton, A., et al., “A Nationwide Survey of Patient Centered Medical Home Demonstration Projects.” *Journal of General Internal Medicine* 25(6): 584 – 592.

**BACKGROUND:** The patient centered medical home has received considerable attention as a potential way to improve primary care quality and limit cost growth. Little information exists that systematically compares PCMH pilot projects across the country.

**DESIGN:** Cross-sectional key-informant interviews.

**PARTICIPANTS:** Leaders from existing PCMH demonstration projects with external payment reform.

**MEASUREMENTS:** We used a semi-structured interview tool with the following domains: project history, organization and participants, practice requirements and selection process, medical home recognition, payment structure, practice transformation, and evaluation design.

**RESULTS:** A total of 26 demonstrations in 18 states were interviewed. Current demonstrations include over 14,000 physicians caring for nearly 5 million patients. A majority of demonstrations are single payer, and most utilize a three component payment model (traditional fee for service, per person per month fixed payments, and bonus performance payments). The median incremental revenue per physician per year was $22,834 (range $720 to $91,146). Two major practice transformation models were identified—consultative and implementation of the chronic care model. A majority of demonstrations did not have well-developed evaluation plans.

**CONCLUSION:** Current PCMH demonstration projects with external payment reform include large numbers of patients and physicians as well as a wide spectrum of implementation models. Key questions exist around the adequacy of current payment mechanisms and evaluation plans as public and policy interest in the PCMH model grows.

Steiner, B. D., et al., “Community Care of North Carolina: Improving Care Through Community Health Networks”. *Annals of Family Medicine* 6(4) (July/August 2008): 361- 367

**ABSTRACT:** The United States leads the world in health care costs but ranks far below many developed countries in health outcomes. Finding ways to narrow this gap remains elusive. This article describes the response of one state to establish community health networks to achieve quality, utilization, and cost objectives for the care of its Medicaid recipients. The program, known as Community Care of North Carolina, is an innovative effort organized and operated by practicing community physicians. In partnership with hospitals, health departments, and departments of social services, these community networks have improved quality and reduced cost since their inception a decade ago. The program is now saving the State of North Carolina at least $160 million annually. A description of this experience and the lessons learned from it can inform others seeking to implement effective systems of care for patients with chronic illness.

Crabtree, B. F., et al., “Summary of the National Demonstration Project and Recommendations for the Patient-Centered Medical Home” *Annals of Family Medicine* 8(Supplement 1) (2010): 580 – 590.

**ABSTRACT:** This article summarizes findings from the National Demonstration Project (NDP) and makes recommendations for policy makers and those implementing patient centered medical homes (PCMHs) based on these findings and an understanding of diverse efforts to transform primary care.

The NDP was launched in June 2006 as the first national test of a particular PCMH model in a diverse sample of 36 family practices, randomized to facilitated or self-directed groups. An independent evaluation team used a multi method evaluation strategy, analyzing data from direct observation, depth interviews, e-mail streams, medical record audits, and patient and clinical staff surveys. Peer reviewed manuscripts from the NDP provide answers to 4 key questions: (1) Can the NDP model be built? (2) What does it take to build the NDP model? (3) Does the NDP model make a difference in quality of care? and (4) Can the NDP model be widely disseminated?

We find that although it is feasible to transform independent practices into the NDP conceptualization of a PCMH, this transformation requires tremendous effort and motivation, and benefits from external support. Most practices will need additional resources for this magnitude of transformation.

Recommendations focus on the need for the PCMH model to continue to evolve, for delivery system reform, and for sufficient resources for implementing personal and practice development plans. In the meantime, we find that much can be done before larger health system reform.

Ginsburg, P. B., et al., “Making Medical Homes Work: Moving from Concept to Practice” *Center for Studying Health System Change: Policy Perspective* No. 1 (December 2008)

Based on these experiences, we’ve identified four critical opera­tional issues in the implementation of most medical home models that we believe have potential to make or break a successful pro­gram: (1) how to qualify physician practices as medical homes; (2) how to match patients to their medical homes; (3) how to engage patients and other providers to work with medical homes in care coordination; and (4) how to pay practices that serve as medical homes. Drawing on published data and our on-the-ground exper­tise, we hope that these analyses will guide clinicians, payers and policy makers as they attempt to build a solid foundation for suc­cessful medical home initiatives. Doing so will improve the chanc­es that the medical home concept can serve as a stepping stone to broader reforms in health care payment and delivery systems.

**Medical Homes as a Stepping Stone to Broader Payment Reform**

In the long term, medical home payment approaches could serve as a model for transitioning payment for care of chronic con­ditions from fee for service to capitation as much as possible. Coupling capitation with bonuses based on system cost savings and quality outcomes would better align incentives for preventive care, coordination and quality improvement.

The daunting constraints of already soaring health care spend­ing imply that long-term improvements in primary care payment might need to occur in a zero-sum fashion involving shifts of resources from non-primary care services. Payers can influence the degree to which this shift is gradual and acceptable to special­ists. Paying for medical home services without immediate expecta­tions of budget neutrality might begin to correct the imperfections of the fee-for-service system in a way that would minimize oppo­sition from non-primary care providers, bettering the chances of broad reform stepping ahead.

Reid, R. J., et al., “The Group Health Medical Home At Year Two: Cost Savings, Higher Patient Satisfaction, And Less Burnout For Providers” *Health Affairs* 29(5) (2010):835-843.

**ABSTRACT:** As the patient-centered medical home model emerges as a key vehicle to improve the quality of health care and to control costs, the experience of Seattle-based Group Health Cooperative with its medical home pilot takes on added importance. This paper examines the effects of the medical home prototype on patients’ experiences, quality, burnout of clinicians, and total costs at twenty-one to twenty-four months after

implementation. The results show improvements in patients’ experiences, quality, and clinician burnout through two years. Compared to other Group Health clinics, patients in the medical home experienced 29 percent fewer emergency visits and 6 percent fewer hospitalizations.

We estimate total savings of $10.3 per patient per month twenty-one months into the pilot. We offer an operational blueprint and policy recommendations for adoption in other health care settings.

**Conclusion:** Group Health’s experience in a prototype clinic suggests that primary care enhancements, in the form of the medical home, hold promise for controlling costs, improving quality, and better meeting the needs of patients and care teams.

We offer an operational blueprint, but success in other settings will depend on leadership, resourcing, electronic health records, change management, and aligned incentives.

Primary care transformation represents a complex system redesign that requires a policy environment that aligns payment and training to support this work. It also requires organizations in which leaders, managers, and care providers are highly engaged in achieving this change.

“A Compilation of PCMH Pilot and Demonstration Projects” *Patient-Centered Primary Care Collaborative (PCPCC)*, 2008

**EVIDENCE ON THE EFFECTIVENESS OF THE PATIENT-CENTERED MEDICALHOME ON QUALITY AND COST**

The Patient-Centered Medical Home (PCMH) is a model of health care delivery that incorporates the following characteristics associated with better outcomes and lower costs:

* The PCMH is built upon the documented value of primary care in achieving better health outcomes, higher patient experience, and more efficient use of resources. Patients who receive care from a PCMH have continuous access to a personal physician who provides comprehensive and coordinated care for the large majority of their health care needs (from Institute of Medicine definition of primary care).
* The PCMH would be responsible for all of the patients’ health care needs: acute care, chronic care, preventive services, and end of life care working with teams of health care professionals. The PCMH would coordinate the care of its patients with specialists, lab/x-ray facilities, hospitals, home care agencies, and all other health care professionals on the patient care team.
* The PCMH would adopt the principles of patient-centeredness: allowing patients free choice of physician, providing prompt appointments, reducing waiting times, and delivering care based on the best evidence on clinical effectiveness, empowering patients to partner with their personal physicians on decision-making, and providing care in a culturally and linguistically appropriate manner.
* The PCMH would use health information systems to provide data and reminder prompts such that all patients receive needed services.

According the Center for Evaluative Clinical Sciences at Dartmouth, states in the US that relied more on primary care have:

* Lower Medicare spending (inpatient reimbursements and Part B payments);
* Lower resource inputs (hospital beds, ICU beds, total physician labor, primary care labor, and medical specialist labor);
* Lower utilization rates (physician visits, days in ICUs, days in the hospital, and fewer patients seeing 10 or more physicians);
* Better quality of care (fewer ICU deaths and a higher composite quality score).

Additionally, according to a recent article published in the American Journal of Medicine, studying utilization rates versus primary care physician density in total physician population, **an increase from 35 to 40% PCP density serving 775,000 people could be projected to translate into:**

• 2,500 fewer inpatient admissions per year

• 15,000 fewer Emergency Room Department visits

• 2,500 fewer surgeries

Barbara Starfield of Johns Hopkins University reviewed dozens of studies, comparing health care in the United States with other countries as well within the U.S., and found that:

* Within the United States, adults with a primary care physician rather than a specialist had 33 percent lower costs of care and were 19 percent less likely to die, after adjusting for demographic and health characteristics.
* Primary care physician supply is consistently associated with improved health outcomes for conditions like cancer, heart disease, stroke, infant mortality, low birth weight, life expectancy, and self-rated care.
* In both England and the United States, each additional primary care physician per 10,000 persons is associated with a decrease in mortality rate of 3 to 10 percent.
* In the United States, an increase of just one primary care physician is associated with

1.44 fewer deaths per 10,000 persons.

An orientation to primary care reduces socio-demographic and socio-economic disparities. African Americans who have a primary care physician are less likely to die prematurely.

A medical home can reduce or even eliminate racial and ethnic disparities in access and quality for insured persons, a new Commonwealth Fund report finds. When adults have a medical home, their access to needed care, receipt of routine preventive screenings, and management of chronic conditions improve substantially.

The Fund has also found that when primary care physicians in the United States effectively manage care in the office setting, patients with chronic diseases like diabetes, congestive heart failure, and adult asthma have fewer complications, leading to fewer avoidable hospitalizations.

A research team from RAND and the University of California at Berkeley undertook a rigorous evaluation of care provided according to PCMH principles. For almost 4,000 patients with diabetes, congestive heart failure (CHF), asthma and depression, they found that:

• Patients with diabetes had significant reductions in cardiovascular risk;

• CHF patients had 35% fewer hospital days;

• Asthma and diabetes patients were more likely to receive appropriate therapy.

The North Carolina Medicaid program enrolls recipients in a network of physician-directed medical homes. A Mercer analysis showed that an up-front $10.2 million investment for North Carolina Community Care operations in SFY04 saved $244 million in overall health care costs for the state. Similar results were found in 2005 and 2006.

The Commonwealth Fund reports that Denmark has organized its entire health care system around patient-centered medical homes, achieving the highest patient satisfaction ratings in the world.

Primary care physicians are highly accessible and supported by an outstanding information system that assists them in coordinating care. Among Western nations, Denmark has among the lowest per capita health expenditures and highest primary care rankings.

**THE BOTTOM LINE**

Care delivered by primary care physicians in a Patient-Centered Medical Home is consistently associated with better outcomes, reduced mortality, fewer preventable hospital admissions for patients with chronic diseases, lower utilization, improved patient compliance with recommended care, and lower Medicare spending.

**Accountable Care Organization (ACO)**

Song, Z., et al., “Health care spending and quality in year 1 of the alternative quality contract.” *New England Journal of Medicine* 365(10) (September 2011): 909 – 918.

#### BACKGROUND: In 2009, Blue Cross Blue Shield of Massachusetts (BCBS) implemented a global payment system called the Alternative Quality Contract (AQC). Provider groups in the AQC system assume accountability for spending, similar to accountable care organizations that bear financial risk. Moreover, groups are eligible to receive bonuses for quality.

#### METHODS: Seven provider organizations began 5-year contracts as part of the AQC system in 2009. We analyzed 2006-2009 claims for 380,142 enrollees whose primary care physicians (PCPs) were in the AQC system (intervention group) and for 1,351,446 enrollees whose PCPs were not in the system (control group). We used a propensity-weighted difference-in-differences approach, adjusting for age, sex, health status, and secular trends to isolate the treatment effect of the AQC in comparisons of spending and quality between the intervention group and the control group.

#### RESULTS: Average spending increased for enrollees in both the intervention and control groups in 2009, but the increase was smaller for enrollees in the intervention group -$15.51 (1.9%) less per quarter (P=0.007). Savings derived largely from shifts in outpatient care toward facilities with lower fees; from lower expenditures for procedures, imaging, and testing; and from a reduction in spending for enrollees with the highest expected spending. The AQC system was associated with an improvement in performance on measures of the quality of the management of chronic conditions in adults (P<0.001) and of pediatric care (P=0.001), but not of adult preventive care. All AQC groups met 2009 budget targets and earned surpluses. Total BCBS payments to AQC groups, including bonuses for quality, are likely to have exceeded the estimated savings in year 1.

#### CONCLUSIONS: The AQC system was associated with a modest slowing of spending growth and improved quality of care in 2009. Savings were achieved through changes in referral patterns rather than through changes in utilization. The long-term effect of the AQC system on spending growth depends on future budget targets and providers' ability to further improve efficiencies in practice. (Funded by the Commonwealth Fund and others).

Colla, C. H., et al., “Spending Differences Associated With the Medicare Physician Group Practice Demonstration” *Journal of the American Medical Association* 308 (10) (September 12, 2012): 1015 – 1023.

**Context:** The Centers for Medicare & Medicaid Services (CMS) recently launched accountable care organization (ACO) programs designed to improve quality and slow cost growth. The ACOs resemble an earlier pilot, the Medicare Physician Group Practice Demonstration (PGPD), in which participating physician groups received bonus payments if they achieved lower cost growth than local controls and met quality targets. Although evidence indicates the PGPD improved quality, uncertainty remains about its effect on costs.

**Objective:** To estimate cost savings associated with the PGPD overall and for beneficiaries dually eligible for Medicare and Medicaid.

**Design:** Quasi-experimental analyses comparing preintervention (2001-2004) and postintervention (2005-2009) trends in spending of PGPD participants to local control groups. We compared estimates using several alternative approaches to adjust for case mix.

**Setting**:Ten physician groups from across the United States.

**Patients and Participant:** The intervention group was composed of fee-for-service Medicare beneficiaries (n=990 177) receiving care primarily from the physicians in the participating medical groups. Controls were Medicare beneficiaries (n=7 514 453) from the same regions who received care largely from non-PGPD physicians. Overall, 15% of beneficiaries were dually eligible for Medicare and Medicaid.

**Main Outcome Measure:** Annual spending per Medicare fee-for-service beneficiary.

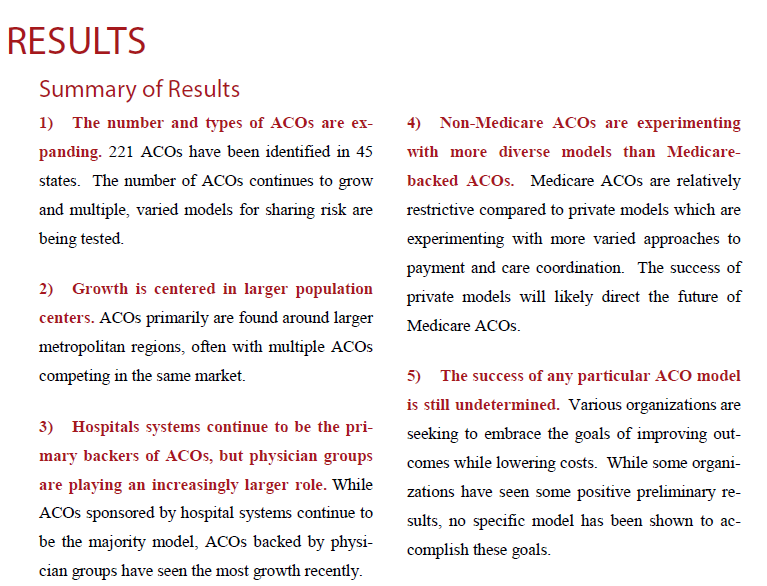
**Results:** Annual savings per beneficiary were modest overall (adjusted mean $114,95% CI, $12-$216). Annual savings were significant in dually eligible beneficiaries (adjusted mean $532, 95% CI, $277-$786), but were not significant among nondually eligible beneficiaries (adjusted mean $59,95% CI, $166 in savings to $47 in additional spending). The adjusted mean spending reductions were concentrated in acute care (overall, $118,95% CI, $65-$170; dually eligible: $381,95% CI, $247-$515; nondually eligible: $85,95% CI, $32- $138). There was significant variation in savings across practice groups, ranging from an overall mean per-capita annual saving of $866 (95% CI, $815-$918) to an increase in expenditures of$749 (95% CI, $698-$799). Thirty-day medical readmissions decreased overall (−0.67%, 95% CI, −1.11% to −0.23%) and in the dually eligible (−1.07%, 95% CI, −1.73%to−0.41%), while surgical readmissions decreased only for the dually eligible (−2.21%, 95% CI, −3.07% to −1.34%). Estimates were sensitive to the risk-adjustment method.

**Conclusions:** Substantial PGPD savings achieved by some participating institutions were offset by a lack of saving at other participating institutions. Most of the savings were concentrated among dually eligible beneficiaries.

Rosenbaum, S. and T. Burke. “Accountable Care Organizations” *Law and the Public’s Health 126 (*November-December 2011): 875-878

This installment of Law and the Public’s Health examines accountable care organizations (ACOs), a health-care delivery system centerpiece of the Affordable Care Act (ACA).1 ACOs represent a new Medicare payment model, and the ACA contains provisions to expand the model to Medicaid and private payers. Health-care providers and insurers are closely watching implementation of the ACO reforms because of their potential impact on health-care organization, delivery, quality, and costs. Following a description of the legislative reforms, the broader implications of ACOs for public health policy and practice are discussed.

Muhlestain, D., et al., “Growth and Dispersion of Accountable Care Organizations: June 2012 Update” *Center For Accountable Care Intelligence*. Leavitt Partners

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Eddy, D. and R. Shah “A Simulation Shows Limited Savings From Meeting Quality Targets Under The Medicare Shared Savings Program” *Health Affairs* (October 3, 2012)

**ABSTRACT:** The Medicare Shared Savings Program, created under the Affordable Care Act, will reward participating accountable care organizations that succeed in lowering health care costs while improving performance. Depending on how the organizations perform on several quality measures, they will “share savings” in Medicare Part A and B

payments—that is, they will receive bonus payments for lowering costs. We used a simulation model to analyze the effects of the Shared Savings Program quality measures and performance targets on Medicare costs in a simulated population of patients ages 65–75 with type 2 diabetes. We found that a ten-percentage-point improvement in performance on diabetes quality measures would reduce Medicare costs only by up to about 1 percent. After the costs of performance improvement, such as additional tests or visits, are accounted for, the savings would decrease or become cost increases. To achieve greater savings, accountable care organizations will have to lower costs by other means, such as through improved use of information technology and care coordination.

Larson, B. K., et al., “Insights From Transformations Under Way At Four Brookings-Dartmouth Accountable Care Organization Pilot Sites”. *Health Affairs* 31 (11) (2012): 2395 - 2406

**ABSTRACT:** This cross-site comparison of the early experience of four provider organizations participating in the Brookings-Dartmouth Accountable Care Organization Collaborative identifies factors that sites perceived as enablers of successful ACO formation and performance. The four pilots varied in size, with between 7,000 and 50,000 attributed patients and 90 to 2,700 participating physicians. The sites had varying degrees of experience with performance-based payments; however, all formed collaborative new relationships with payers and created shared savings agreements linked to performance on quality measures. Each organization devoted major efforts to physician engagement. Policy makers now need to consider how to support and provide incentives for the successful formation of multipayer ACOs, and how to align private sector and CMS performance measures. Linking providers to learning networks where payers and providers can address common technical issues could help. These sites’ transitions to the new payment model constitutes an ongoing journey that will require continual adaptation in the structure of contracts and organizational attributes.

Unger, J. “Don’t bet the ranch on ACOs” *The Journal of Family Practice* 61 (April 2012): 185 - 186

**CONCLUSION:** The field test failed. The ACO concept has already been field tested, as mandated by Congress. Ten of the nation's most respected large multispecialty groups were selected as test sites, including 2 that are associated with academic medical centers. Each group was required to attain 32 quality metrics and exceed a savings threshold of 2% to qualify for bonus compensation.

Only 2 of the 10 were able to generate savings in all 5 years. One major health system required 3 years before exceeding the savings threshold. Another—a prominent health system that has more than 30 years of managed care experience—qualified for bonus compensation in just a single year.''

If most of these 10 respected institutions struggled over 5 years to generate incentive payments from Medicare, the prospect of other ACOs succeeding financially is grim indeed.

This is sobering news for physicians, hospitals, and other providers who are planning to invest their time, money, and efforts into forming ACOs. Based on the data derived from the government's own pilot project, successful implementation of the ACO concept will be very difficult—and will lead to higher overall health care costs.

The government has already demonstrated that the ACO concept is doomed to fail. Let's heed the warning signs. Resist the urge to put your hard-earned cash at risk with a government-sponsored health care system—especially one that protects Congress and fails to adequately address issues such as preventive medicine, cost-effective care, and tort reform.

**Non Traditional**

Caplan, T. F., et al., “Clinician feedback on using episode groupers with Medicare claims data.” *Health Care Finance Review* 31(1) (Fall 2010): 51 – 61.

CMS is investigating techniques that might help identify costly physician practice patterns. One method presently under evaluation is to compare resource use for certain episodes of care using commercially available episode grouping software. Although this software has been used by the private sector to classify insured individuals' medical claims into episodes of care, it has never been used with fee-for-service Medicare claims except in the studies by the Medicare Payment Advisory Commission (MedPAC) and CMS. This study reviews and reports on clinician feedback on the most obvious and important decisions that must be faced by Medicare to use grouped claims data as the foundation for a physician performance measurement system. The panel reactions show the importance of bringing persons with clinical knowledge into the development process. The clinician feedback confirms that additional research is needed.

McDonough, R. P., et al., “Retrospective financial analysis of medication therapy management services from the pharmacy's perspective.” *Journal of the American Pharmacists* Association 50(1) (January/February 2010): 62 – 66.

#### OBJECTIVE: To determine the net financial gain or loss for medication therapy management (MTM) services provided to patients by an independent community pharmacy during 16 months of operation.

#### DESIGN: Retrospective study.

#### SETTING: Independent community pharmacy in Iowa City, IA, from September 1, 2006, to December 31, 2007.

#### PATIENTS: Patients receiving MTM services during the specified period who had proper documentation of reimbursement for the services.Intervention: MTM services were provided to the patient and documented by the pharmacist or student pharmacist.

#### MAIN OUTCOME MEASURE: Net financial gains or losses for providing MTM services. Sensitivity analyses included costs that might be incurred under various conditions of operation.

#### RESULTS: 103 initial and 88 follow-up MTM visits were conducted during a 16-month time period. The total cost for these services to the pharmacy was $11,191.72. Total revenue from these services was $11,195.00; therefore, the pharmacy experienced a net financial gain of $3.28. Sensitivity analyses were conducted, revealing the net gain/loss to the pharmacy if a student pharmacist was used and the net gain/loss if the pharmacist needed extra training to provide the services. Using a student pharmacist resulted in a net gain of $6,308.48, while extra training for the pharmacist resulted in a net loss of $1,602.72.

#### CONCLUSION: The MTM service programs showed a positive financial gain after 16 months of operation, which should encourage pharmacists to incorporate these services into their practice

Barlas, S. “Part D Changes for 2013 Will Put Pressure on P&T Committees: Drug Utilization Reviews and Medication Therapy Management Programs Under the Gun” *Pharmacy & Therapeutics* 37(6) (June 2012): 335 – 366.

Medicare made it clear it was looking for the next opportunity to make a regulatory change. Until then, it wants the LTC industry to make voluntary changes in the way it uses consultant pharmacists (1) either by adopting voluntary transparency measures such as (a) separate contracting for LTC consulting services from dispensing and other pharmacy services; (b) payment by LTC facilities of a fair market rate for consultant pharmacist services; and (c) disclosure by consultant pharmacists to the LTC facility of any affiliations that would pose potential conflicts of interest; or by (2) executing an integrity agreement by the consultant pharmacists. The ASCP has already endorsed conflict-of-interest disclosures to nursing homes, payment to consultant pharmacists at market rates, and the issuance of integrity statements by LTC pharmacies.

The widespread adoption of these measures would probably cool Medicare’s regulatory ardor a bit; however, the agency’s drive to improve Part D effectiveness and reduce Part D costs will result in a few more turns of the regulatory screw—on formulary policies, P&T committees, and pharmacists—when the agency proposes the 2014 Call Letter and its associated proposed rule, probably sometime at the end of this year.

Leikola, S. N., et al., “Comprehensive medication reviews for elderly patients: findings and recommendations to physicians.” *Journal of the American Pharmacists* Association 52(5) (September/October 2012): 630 – 633.

#### Objectives: To assess drug-related problems (DRPs) documented by specially trained community pharmacists during the Finnish comprehensive medication review (CMR) procedure and to describe the resulting interventions for home-dwelling and assisted-living primary care patients 65 years or older.

#### Methods: Retrospective analysis of applicable written CMR case reports for primary care patients 65 years or older by 26 community pharmacists attending a 1.5-year CMR accreditation training (174 patients recruited; 121 included in the analysis). The main outcome measures were DRPs and physicians' acceptance of pharmacists' recommendations.

#### Results: The pharmacists reported a total of 785 DRPs (average of 6.5/patient). DRPs were more common among home-dwelling patients (7.2) than those in the assisted-living setting (5.5; P = 0.014) but were similar in nature. Inappropriate drug choices were the most common DRPs (17% of DRPs), involving most often hypnotics and sedatives. Also, indications with no treatment were common (16%), particularly those associated with cardiovascular diseases and osteoporosis. Pharmacists made 649 recommendations, 55% (n = 360) of which were accepted by physicians without revision. In 51% of DRPs (n = 403), CMRs resulted in change of drug therapy; stopping a drug was the most common change.

#### Conclusion: Specially trained pharmacists were able to identify DRPs among elderly primary care patients by using a CMR procedure, and more than one-half of the identified DRPs led to medication changes. The pharmacists' special knowledge of geriatric pharmacotherapy and access to clinical patient data were crucial for recognizing DRPs.

Field, T. S., et al., “The costs associated with adverse drug events among older adults in the ambulatory setting.” Medical Care 3(12) (December 2005): 1171 – 1176.

#### Background: Reducing the rate of adverse drug events in the ambulatory setting may require large investments in quality improvement efforts and technologic innovations. Little evidence is available on the potential resulting savings.

#### Objective:The objective of this study was to estimate the costs associated with adverse drug events among older adults in the ambulatory setting.

#### Research Design:This study consisted of a 1-year retrospective cohort study among Medicare enrollees of a large multispecialty group practice. The study included 1210 older adults with an adverse drug event. A matched comparison group was randomly selected from enrollees with recent healthcare encounters and medication dispenses.

#### Outcome Measure: Difference between estimated costs for medical care utilization during the 6 weeks before and 6 weeks beginning on the day of an adverse drug event.

#### Results:For all adverse drug events, the increase in postevent costs over the preevent period was $1310 (95% confidence interval [CI], $625-$1995) greater for those experiencing an adverse drug event than the comparison group after controlling for age, sex, comorbidity, number of scheduled medications, and having been hospitalized during the preevent period. For preventable adverse drug events, the adjusted increase was $1983 (95% CI, $193-$3773) greater for cases. Based on rates of adverse drug events and these cost estimates, 1000 older adults would have annual costs related to adverse drug events in the ambulatory setting of $65,631 with $27,365 of this associated with preventable events.

#### Conclusions:Adverse drug events in the ambulatory setting substantially increase the healthcare costs of elderly persons.

Shoemaker, S. J. and A. Hassol “Understanding the landscape of MTM programs for Medicare. Part D: Results from a study for the Centers for Medicare & Medicaid services.” *Journal of the American Pharmacists* Association 51(4) (July/August 2011): 520 – 526.

#### Objectives: To describe the features of medication therapy management (MTM) programs, including eligibility criteria, enrollment, services, and reimbursement, and to describe the criteria used to evaluate MTM programs and assess the evidence of relevance to Medicare.

#### Design: Descriptive, exploratory, nonexperimental study.

#### Setting: United States between July 2007 and June 2008.

#### Participants: 60 key informants from 46 different organizations and case studies with 28 representatives from four MTM programs.

#### Intervention: Literature review, key informant interviews, and evaluation of case studies.

#### Main Outcome Measures: MTM program features and evidence of effectiveness.

#### Results: MTM programs used a variety of practice models. Medicare MTM programs used different eligibility criteria than MTM programs sponsored by Medicaid or other payers. MTM programs that required patients to opt-in had less success in enrolling participants than those using opt-out. Most MTM programs conducted annual medication reviews. Most non-Medicare MTM programs provided face-to-face interventions, whereas Medicare MTM programs relied more on telephone or mail; no research tested the effectiveness of different modes. Almost all MTM programs used pharmacists to provide services. Little research on Medicare MTM programs was available. Costs were commonly measured in the MTM literature, although results were inconsistent. A few studies demonstrated significant improvements in intermediate outcomes (e.g., low-density lipoprotein cholesterol), while less studies demonstrated an impact on serious sequelae (e.g., emergency department visits).

#### Conclusion:Medicare MTM programs were still evolving when this study was conducted, and we found limited evidence to determine which beneficiaries would benefit most from MTM, which features achieved the desired outcomes, and which outcomes should be measured to compare MTM program performance.

Patterson S.M., et al., “Interventions to improve the appropriate use of polypharmacy for older people” (Review). *The Cochrane Collaboration*. The Cochrane Library 5 (2012)

**Background**

Inappropriate polypharmacy is a particular concern in older people and is associated with negative health outcomes. Choosing the best interventions to improve appropriate polypharmacy is a priority, hence there is growing interest in appropriate polypharmacy, where many medicines may be used to achieve better clinical outcomes for patients.

**Objectives**

This review sought to determine which interventions alone, or in combination, are effective in improving the appropriate use of polypharmacy and reducing medication-related problems in older people.

**Search methods**

A range of literature databases including MEDLINE and EMBASE were searched in addition to handsearching reference lists. Search terms included polypharmacy, Beers criteria, medication appropriateness and inappropriate prescribing.

**Selection criteria**

A range of study designs were eligible. Eligible studies described interventions affecting prescribing aimed at improving appropriate polypharmacy in people aged 65 years and older where a validated measure of appropriateness was used (e.g. Beers criteria or Medication Appropriateness Index - MAI).

**Data collection and analysis**

Three authors independently reviewed abstracts of eligible studies, extracted data and assessed risk of bias of included studies. Study specific estimates were pooled, using a random-effects model to yield summary estimates of effect and 95% confidence intervals.

**Main results**

Electronic searches identified 2200 potentially relevant citations, of which 139 were examined in detail. Following assessment, 10 studies were included. One intervention was computerized decision support and nine were complex, multifaceted pharmaceutical care provided in a variety of settings. Appropriateness of prescribing was measured using the MAI score post intervention (seven studies) and/or Beers criteria (four studies). The interventions included in this review demonstrated a reduction in inappropriate medication use. A mean difference of -6.78 (95%CI -12.34 to -1.22) in the change in MAI score in favour of the intervention group (four studies).

Post intervention pooled data (five studies) showed a mean reduction of -3.88 (95% CI -5.40 to -2.35) in the summated MAI score and a mean reduction of -0.06 (95% CI -0.16 to 0.04) in the number of Beers drugs per patient (three studies). Evidence of the effect of the interventions on hospital admissions (four studies) was conflicting. Medication-related problems, reported as the number of adverse drug events (three studies), reduced significantly (35%) post intervention.

**Authors’ conclusions**

It is unclear if interventions to improve appropriate polypharmacy, such as pharmaceutical care, resulted in a clinically significant improvement; however, they appear beneficial in terms of reducing inappropriate prescribing and medication-related problems.

Fahlman, C., et al., “Potentially Inappropriate Medication Use by Medicaid Choice Beneficiaries in the Last Year of Life”. *Journal of Palliative Medicine* 10 (3) (2007): 686 – 695

**Background:** Regardless of the payer and the period studied the prevalence of potentially inappropriate medication use in the elderly ranged from 21% to 40%.

**Objective:** To look at potentially inappropriate prescribing in a group of Medicare Choice beneficiaries in their last year of life (LYOL) in a large national managed care organization.

**Research design:** Retrospective review of Medicare Choice decedents’ drug claims and enrollment data collected between January 1998 and December 2000, supplemented by the Medicare denominator file and 1990 Census data.

**Subjects:** Four thousand six hundred two beneficiaries in a large national managed care organization.

**Measures:** We analyzed the relationship between disagreement with the Beers’ criteria and socio-demographic descriptors, insurance characteristics, and cause of death. We used logistic regression techniques to estimate factors associated with the disagreement.

**Results:** Two thousand thirty-one beneficiaries (44%) had at least one claim in the LYOL that disagreed with a Beers’ criterion, 15% experienced more than one unique Beers’ disagreement. The most common disagreements were for the use of propoxyphene (15.0%), followed by zolpidem (3.8%), and amitriptyline (2.8%). Based on total claims, cancer patients were most likely to receive propoxyphene (35.3%) followed by patients with a heart condition (29.6%). A large proportion of the potentially inappropriate prescribing involves psychoactive drugs. The logistic model showed fewer Beers’ criteria breaches associated with being male and being non-white. Beers’ breaches were more common if the beneficiary has increasing prescription use or died from cancer.

**Conclusion:** This study showed that many beneficiaries have prescriptions that contravene the Beers’ criteria.

Pinto, S. L. et al., “Evaluation of outcomes of a medication therapy management program for patients with diabetes” *Journal American Pharmacists Association* 52 (2012): 519 –523.

**Objective:** To measure the impact of an employer-sponsored, pharmacist-provided medication therapy management (MTM) program on clinical outcomes and social and process measures for patients with diabetes with or without associated comorbid conditions.

**Methods:** Prospective longitudinal study that took place at seven independent pharmacies in Lucas County, OH. A total of 228 patients with diabetes were enrolled. At 6-month intervals, patients were counseled by their pharmacists. Outcome measures included clinical outcomes (glycosylated hemoglobin [A1C], systolic blood pressure (SBP), and diastolic blood pressure [DBP]), social measures (caffeine intake, alcohol

consumption, smoking, and exercise), and process measures (visits to ophthalmologist, podiatrist, and dentist). Wilcoxon signed–rank test and percentages were used to report findings.

**Results:** Mean (+/- SD) A1C concentration decreased from 7.08 +/- 1.54% to 6.89 +/-1.30% at 12 months. Patients with A1C levels greater than 7% at baseline averaged a decrease of 0.5% at 6 months and 0.75% at 12 months. Mean SBP values decreased significantly from baseline to 12 months. A total of 87 patients with a baseline SBP greater than 130 mm Hg experienced a significant change in blood pressure from baseline to 6 months (−7.1 +/- 3.32 mm Hg), and 65 patients experienced a significant change in blood pressure from baseline to 12 months (−11.49 +/- 0.15 mm Hg). A total of 104 patients with a baseline DBP more than 80 mm Hg experienced a significant

decrease of 4.44 +/- 1.25 mm Hg at 6 months. Caffeine and alcohol consumption and smoking decreased and exercise increased. In addition, the percentage of patients who visited specialists increased.

**Conclusion:** Patients with diabetes experienced improvements in multiple clinical, social, and process measures.

Johnson, J. A. and J. L. Bootman. “Drug-related morbidity and mortality and the economic impact of pharmaceutical care”. *American Journal Health-System Pharmacy* 54 (March 1, 1997): 554-558

**Conclusion**. According to a cost-of-illness model, the provision of pharmaceutical care in all ambulatory care pharmacy settings would reduce the occurrence of negative therapeutic outcomes by 53–63% and avoid $45.6 billion in direct health care costs.

Fox, D., et al., “A medication therapy management program’s impact on low-density lipoprotein cholesterol goal attainment in Medicare Part D patients with diabetes”. *American Pharmacists Association* 49 (March/April 2009):192 - 199.

**Objectives:** To determine a medication therapy management (MTM) service’s impact on (1) Healthcare Effectiveness Data and Information Set (HEDIS) quality measures and (2) use and cost expenditures.

**Design:** Nonequivalent group, quasiexperimental study.

**Setting:** Florida, January 1, 2006, through September 30, 2007.

**Participants:** 2,114 Florida Health Care Plans Medicare Part D enrollees with diabetes.

**Intervention**: Intervention group participated in the MTM program during the HEDIS measurement year.

**Main outcome measures:** Presence of low-density lipoprotein cholesterol (LDL-C) screening, LDL-C values, and LDL-C control (<100 mg/dL). The use measure was the total number of 30-day medication equivalents. Cost measures were (1) total Medicare Part D drug cost, (2) enrollees’ out-of-pocket Part D medication costs, and (3) total medication copayments. Statistical analyses included chi-square, independent and paired *t* tests, and analysis of variance with post hoc comparisons.

**Results:** Of 2,114 enrollees eligible for comprehensive diabetes care (CDC) according

to HEDIS guidelines, 255 participated in the MTM intervention group and 56 patients were MTM eligible but opted out of the program or could not be reached for medication review during 2008 (MTM nonparticipants). A higher proportion of patients in the MTM participant group had LDL-C levels less than 100 mg/dL (69.0%) compared with those in the MTM nonparticipant (50.0%) and CDC only (54.1%) groups (χ2 = 20.9, P < 0.001). The two control groups’ average LDL-C (90.8 and 93.6 mg/dL) was significantly higher than the intervention group (83.4 mg/dL, P < 0.001). Overall, per member per month use and drug costs differed from 2007 to 2008 and enrollees in the MTM participant group had greater percentage cost reductions.

**Conclusion:** Enrollees who were eligible for MTM services but did not receive them had poorer clinical, use, and cost outcomes compared with the MTM intervention group. Pharmacists collaborating with physicians through a MTM program can improve quality of metrics for chronic diseases and reduce medication costs.

Moczygemba, L. R., et al., “Impact of Telephone Medication Therapy Management on Medication and Health-Related Problems, Medication Adherence, and Medicare Part D Drug Costs: A 6-Month Follow Up”. The American Journal of Geriatric Pharmacotherapy 9 (5) (October 2011): 328 – 338.

**Background:** The Medicare Modernization Act of 2003 mandated the provision of medication therapy management (MTM) to eligible Part D beneficiaries to improve medication-related outcomes. As MTM programs evolve, evaluation is necessary to help inform MTM best practices.

**Objective:** The objective of this study was to determine the impact of pharmacist-provided telephone MTM on: (1) medication and health-related problems (MHRPs); (2) medication adherence; and (3) Part D drug costs.

**Methods:** This quasi-experimental study included Part D beneficiaries from a Texas health plan. Andersen’s Behavioral Model of Health Services Use served as the study framework. MTM utilization was the health behavior. Age, gender, and race were predisposing factors, and number of medications, chronic diseases, and medication regimen complexity were need factors. Outcomes were pre-to-post changes in: (1) MHRPs; (2) medication adherence, using the medication possession ratio (MPR); and (3) total drug costs. Multiple regression was used to analyze group differences while controlling for predisposing and need factors.

**Results:** At baseline, the intervention (n = 60) and control (n = 60) groups were not statistically different regarding predisposing and need factors, with the exception of gender. The intervention group had significantly (P = 0.009) more men compared with the control group (51.7% vs 28.3%). There were 4.8 (2.7) and 9.2 (2.9) MHRPs identified at baseline and 2.5 (2.0) and 7.9 (3.0) MHRPs remained at the 6-month follow up in the intervention and control groups, respectively. The intervention group (vs control) had significantly more MHRPs resolved (P = 0.0003). There were no significant predictors of change in MPR or total drug costs from baseline to follow up, although total drug costs decreased by $158 in the intervention group compared with a $118 increase in the control group.

**Conclusions:** A telephone MTM program resolved significantly more MHRPs compared with a control group, but there were no significant changes in adherence and total drug costs.

Cook, D. M., et al., “Self-reported responses to medication therapy management services for older adults: Analysis of a 5-year program”. *Research in Social and Administrative Pharmacy 8* (2012): 217–227.

**Background:** Medication therapy management (MTM) services provide essential reviews of drug regimens and are increasingly recognized as beneficial to patient safety, improved health outcomes, and cost savings.

**Objective:** To assess patient behavioral outcomes from an MTM service, including actions following receipt of a pharmacist report.

**Methods**: A retrospective analysis of an MTM program at the Sanford Center for Aging (NV, USA) was conducted. Outcome measures included whether the patient discussed the review with the physician, whether any changes in the client’s drug regimen occurred, and whether the client feels more knowledgeable about his or her medications. Predictor variables included basic demographics, prescription insurance status, number of prescriptions taken, self-reported health status, and use of medications considered to be high risk. The analysis plan involved the use of multivariate logistic regression models.

**Results:** The odds of discussing the medication review with physicians, making changes recommended in the report, and both discussing and making a change were 65%, 60%, and 67%, respectively, lower among those below poverty level than among those above poverty level; 95% confidence intervals (CIs): 0.15, 0.80; 0.18, 0.85; and 0.15, 0.73, respectively. The odds of those using high-risk drugs of making changes in drug regimens, and of discussing with physicians and making changes together, were 2 times higher than the odds of those not using these drugs, 95% CIs: 1.02, 4.31 and 1.20, 4.87, respectively. The likelihood of those reporting good or excellent health of doing the combination of discussing the MTM report with physicians and to make a drug regimen change was 2 times greater than for those reporting poor to fair health, 95% CI: 1.08, 3.65. Gender, ethnicity, age group, rural status, prescription drug insurance, and high polypharmacy were not significant factors for acting on the medication review in the adjusted model.

**Conclusion:** MTM services are associated with enhanced patient self-advocacy, but like other interventions, they are constrained by social disparities. Greater attention to the resources of target populations to respond to pharmacy services is merited.

Crotty, M. et al., “Does the Addition of a Pharmacist Transition Coordinator Improve Evidence-Based Medication Management and Health Outcomes in Older Adults Moving from the Hospital to a Long-Term Care Facility? Results of a Randomized, Controlled Trial.” *The American Journal of Geriatric Pharmacotherap*y 2(4) (December 2004): 257 – 264.

**Background:** Poorly executed transfers of older patients from hospitals to long term care facilities carry the risk of fragmentation of care, poor clinical outcomes, inappropriate use of emergency department services, and hospital readmission.

**Objective:** The study was conducted to assess the impact of adding a pharmacist transition coordinator on evidence based medication management and health/l outcomes in older adults undergoing first time transfer from a hospital to a long term care facility.

**Conclusions:** Older people transferring from hospital to a long term care facility are vulnerable to fragmentation of care and adverse events. In this study, use of a pharmacist transition coordinator improved aspects of inappropriate use of medicines across health sectors.

Schulz, R. M., et al., “Impact of a Medication Management System on Nursing Home Admission Rate in a Community-Dwelling Nursing Home–Eligible Medicaid Population.” *The American Journal of Geriatric Pharmacotherapy* 9(1) (February 2011): 69 – 79.

**Background**: Community-dwelling frail elderly have an increased need for effective medication management to reside in their homes and delay or avoid admission to nursing homes.

**Objective:** The objective of this study was to examine the impact of a medication management system on nursing home admission within the community-dwelling frail elderly.

**Methods:** This prospective cohort study compared nursing home admission rates in intervention and control clients of a state Medicaid home and community-based waiver program. Groups were matched on age ( +/- 5 years), race, gender, and waiver program start date (+/-120 days). The medication management service consisted of 2 parts:

1. prescription medicines dispensed from the client’s local pharmacy in a calendar card
2. a coordinating service by a health educator to address medication-related problems as they arose. The primary dependent variable was admission to a nursing home

**Results:** A total of 273 clients agreed to participate, enrolled, and had at least 1 prescription dispensed. The matched control group was composed of 800 other clients. The client sample was 72 years of age, 73% (785/1073) non-white, 75% (804/1073) female, and enrolled in the waiver program approximately 50 months. The 2 groups were similar on all demographic variables examined. Six clients (2.2%) in the intervention group and 40 clients (5.0%) in the control group were admitted to a nursing home at least once during the study period. Logistic regression was used to test the

model predicting at least 1 nursing home admission. Control group clients were 2.94 times more likely to be admitted to a nursing home than clients in the intervention group.

**Conclusions:** The medication management service implemented within this study was effective in reducing nursing home admissions in a group of frail community-dwelling elderly.

Moczygemba L., J. C. Barner, and E. Gabrillo. “12-Month Outcomes Of A Pharmacist-Provided Telephone Medication Therapy Management (MTM) Program.” *Value in Health* 14 (2011): A1 – A21.

**CONCLUSIONS:** A telephone MTM program positively impacted MHRPs (medication health related problems). Unadjusted cost comparisons also showed cost savings among the intervention group. Future research should focus on understanding predictors that impact adherence and cost-related MTM outcomes.

Wang, C.C., D. Wei and J. Farley. “Impact Of Monthly Prescription Cap On Medication Persistency Among Patients With Diabetes, Hypertension, Or Hyperlipidemia.” *Journal of Managed Care Pharmacy 19(3) (2013): 258 - 268*.

**CONCLUSIONS:** Patients with chronic conditions subject to medication caps may be vulnerable to medication discontinuation. Policy makers need to consider carefully when implementing such policies on patients with chronic conditions. Our study suggests there is inconclusive evidence that the monthly prescription restriction disrupts the continuation of medications for common chronic health conditions in patients. More research is needed to identify which patients are most vulnerable to the effect of monthly prescription limits and how this policy could potentially affect additional treatment outcomes such as medication adherence, health outcomes, and Medicaid expenditures.

Loeppke R. et. al, “Assessing The Relationship Between Medication Adherence And Employee Productivity”. *Value in Health* 14 (2011) A1 – A21

**CONCLUSIONS**: Despite high rates of adherence in this population, significant medication treatment effects were observed, as were consistent effects of comorbidities, health risks and job class on lost work time. Better targeting of treatment by job class for individuals with high health risks and comorbidities may help reduce health risks and improve productivity outcomes.

Parente, S. T., et al., “Effects of a Consumer Driven Health Plan on Pharmaceutical Spending and Utilization”. *Health Services Research* 43 (October 2008): 1542 - 1556.

**Objectives:** To compare pharmaceutical spending and utilization in a consumer driven health plan (CDHP) with a three-tier pharmacy benefit design, and to examine whether the CDHP creates incentives to reduce pharmaceutical spending and utilization for chronically ill patients, generic or brand name drugs, and mail-order drugs.

**Study Design**: Retrospective insurance claims analysis from a large employer that introduced a CDHP in 2001 in addition to a point of service (POS) plan and a preferred provider organization (PPO), both of which used a three-tier pharmacy benefit.

**Methods:** Difference-in-differences regression models were estimated for drug spending and utilization. Control variables included the employee’s income, age, and gender, number of covered lives per contract, election of flexible spending account, health status, concurrent health shock, cohort, and time trend.

**Results:** CDHP pharmaceutical expenditures were lower than those in the POS cohort in 1 year without differences in the use of brand name drugs. We find limited evidence of less drug consumption by CDHP enrollees with chronic illnesses, and some evidence of less generic drug use and more mail-order drug use among CDHP members.

**Conclusion:**. The CDHP is cost-neutral or cost-saving to both the employer and the employee compared with three-tier benefits with no differences in brand name drug use.

Brummel, A. R., et al., “Optimal Diabetes Care Outcomes Following Face-to-Face Medication Therapy Management Services” Population Health Management 16(1) (2013): 28 - 34.

Pharmacists play an integral role in influencing resolution of drug-related problems. This study examines the relationship between a pharmacist-led and delivered medication therapy management (MTM) program and achievement of Optimal Diabetes Care benchmarks. Data within Fairview Pharmacy Services were used to identify a group of patients with diabetes who received MTM services during a 2007 demonstration project (n = 121) and a control group who were invited to receive MTM services but opted out (n = 103). Rates of achieving optimal diabetes clinical management for both groups were compared using the D5 diabetes measure for years 2006, 2007, and 2008. The D5 components are: glycosolated hemoglobin (HbA1c < 7%); low-density lipoprotein

( < 100 mg/dl); blood pressure ( < 130/80mmHg); tobacco free; and daily aspirin use. Multivariate difference-in-differences (DID) estimation was used to determine the impact of 1 year of MTM services on each care component. Patients who opted in for MTM had higher Charlson scores, more complex medication regimens, and a higher percentage of diabetes with complications (P < 0.05). In 2007, the percentage of diabetes patients optimally managed was significantly higher for MTM patients compared to 2006 values (21.49% vs. 45.45%, P < 0.01). Nonlinear DID models showed that MTM patients were more likely to meet the HbA1c criterion in 2007 (odds ratio: 2.48, 95% confidence interval [CI]: 1.04–5.85, P = 0.038). Linear DID models for HbA1c showed a mean reduction of 0.54% (95% CI: 0.091%–0.98%, P = 0.018) for MTM patients. An MTM program contributed to improved optimal diabetes management in a population of patients with complex diabetes clinical profiles.

**Conclusion:** In summary, this study suggests that a pharmacist-led and delivered MTM program has the potential to improve optimal diabetes management rates in a population of complex diabetes patients. Therefore, policies at the federal and local levels should be designed to increase patient access to MTM services.

Isetts, B. J., et al., “Clinical and economic outcomes of medication therapy management services: The Minnesota experience” *Journal of the American Pharmacists Association* 48 (2008): 203 - 211.

**Objectives:** To (1) provide medication therapy management (MTM) services to patients, (2) measure the clinical effects associated with the provision of MTM services, (3) measure the percent of patients achieving Healthcare Effectiveness Data and Information Set (HEDIS) goals for hypertension and hyperlipidemia in the MTM services intervention group in relationship to a comparison group who did not receive MTM services, and (4) compare patients' total health expenditures for the year before and after receiving MTM services.

**Design:** Prospective study.

**Setting:** Six ambulatory clinics in Minnesota from August 1, 2001, to July 31, 2002.

**Patient:** 285 intervention group patients with at least 1 of 12 medical conditions using prestudy health claims; 126 comparison group patients with hypertension and 126 patients with hyperlipidemia were selected among 9 clinics without MTM services for HEDIS analysis.

**Intervention:** MTM services provided by pharmacists to BlueCross BlueShield health plan beneficiaries in collaboration with primary care providers.

**Main Outcome Measures:** Drug therapy problems resolved; percentage of patients' goals of therapy achieved and meeting HEDIS measures for hypertension and hypercholesterolemia. Total health expenditures per person were measured for a 1-year period before and after enrolling patients in MTM services.

**Results:** 637 drug therapy problems were resolved among 285 intervention patients, and the percentage of patients' goals of therapy achieved increased from 76% to 90%. HEDIS measures improved in the intervention group compared with the comparison group for hypertension (71% versus 59%) and cholesterol management (52% versus 30%). Total health expenditures decreased from $11,965 to $8,197 per person (n = 186, P < 0.0001). The reduction in total annual health expenditures exceeded the cost of providing MTM services by more than 12 to 1.

**Conclusion:** Patients receiving face-to-face MTM services provided by pharmacists in collaboration with prescribers experienced improved clinical outcomes and lower total health expenditures. Clinical outcomes of MTM services have chronic care improvement and value-based purchasing implications, and economic outcomes support inclusion of MTM services in health plan design.

Devine, E. B., et al., “Strategies to optimize medication use in the physician group practice: The role of the clinical Pharmacist” *Journal of the American Pharmacists Association* 49 (2009): 181 - 191.

**Results:** In 2006–2007, 71% of our hypertensive patients received generic agents compared with a network average for receiving generic agents of 43%, while the proportion of patients with controlled blood pressure increased from 45% to 60%. We saved $450,000 in inpatient costs for deep venous thrombosis.

**Conclusion:** Clinical pharmacists employed in a physician group practice can

optimize medication use, improve care, and reduce costs.

Winston, S. and Yu-Shen Lin “Impact on drug cost and use of Medicare Part D of Medication therapy management services delivered in 2007” *Journal of the American Pharmacists Association* 49 (2009): 813 - 820.

**Objectives:** To describe experiences with medication therapy management (MTM) services delivered to beneficiaries of Mirixa's health plan clients.

**Setting**: United States during 2007.

**Practice description:**Three intervention modalities were offered to provide MTM services: community pharmacy, pharmacist-staffed call centers, and educational mailings. Available data were analyzed to identify any differences among patients receiving any of the three interventions. Patients included in the analysis were those who qualified for MTM services between April 1, 2007, and June 30, 2007. MTM services were provided for these patients between May 1, 2007, and December 31, 2007.

**Practice innovation**: The MirixaPro platform was created to document the activities associated with the five core elements of an MTM service (medication therapy review, creation of a personal medication record, creation of a medication-related action plan [MAP], intervention and/or referral, and documentation and follow-up). It provides a framework for capturing safety interventions, follow-ups with prescribers, and pharmacist instructions to the patients.

**Main outcome measures**:  Part D drug costs, use, and generic dispensing ratio in the pre- and post-MTM periods.

**Results**: 21,336 patients received MTM services from a community pharmacist (face to face, 9,140; by phone, 12,196), 3,436 patients received MTM services from a call center pharmacist, and 49,021 patients received an educational mailing. Patients who had a face-to-face session had a decline in mean monthly drug costs of $29 (from $658 to $629), while drug costs decreased by $40 (from $677 to $637) when the community pharmacist provided the services over the telephone. Mean monthly drug costs decreased by $15 (from $676 to $661) for patients receiving MTM services from a call center pharmacist and did not change for patients receiving an educational mailing ($698 in both periods).

**Conclusion:** Among patients who received MTM services in 2007, drug costs decreased for those who received service from community pharmacists, decreased somewhat for patients who received service from a call center pharmacist, and were unchanged for those who received MTM via mailing. Further studies are needed to assess the effect of various types of MTM interventions on financial, clinical, and humanistic outcomes.

Michaels, N. M., et al., “Retrospective analysis of community pharmacists’ recommendations in the North Carolina Medicaid medication therapy management program” *Journal of the American Pharmacists Association* 50 (2010): 347 - 353.

**OBJECTIVES:** To determine the economic impact of cost-saving alternatives on prescription drug costs for the North Carolina Medicaid medication therapy management (MTM) program and to assess the acceptance of recommendations made by pharmacists to prescribers and the implementation of accepted recommendations.

**DESIGN:** Retrospective analysis.

**SETTING:** 92 Kerr Drug pharmacies in North Carolina from August 1, 2006, to July 31, 2007.

**PARTICIPANTS:** 88 North Carolina Medicaid beneficiaries who received at least 12 prescriptions each month and who completed four quarterly medication reviews by a Kerr Drug pharmacist.

**INTERVENTION:** Assessed recommendations made by Kerr Drug pharmacists.

**MAIN OUTCOME MEASURES:** Rate of acceptance of pharmacist recommendations and overall economic impact of changing from brand-name medications to cost-saving alternatives.

**RESULTS:** Acceptance rate of pharmacist recommendations ranged from 42% to 60%. The rate at which the pharmacists' accepted recommendations were implemented at Kerr Drug pharmacy ranged from 62% to 86% across the four quarterly reviews. Overall economic impact resulted in an average cost savings of $107 per beneficiary to North Carolina Medicaid per year. Quarterly economic impact results revealed that the highest impact occurred during the first quarterly review at $63 per beneficiary.

**Conclusion:** Prescriber acceptance and pharmacy implementation of cost savings alternatives provided an annual average cost savings of $9,444 to North Carolina Medicaid. After pharmacist reimbursement, this savings totaled $2,724.

Brixner, D. and J. B. Watkins. “Can CER Be an Effective Tool for Change in the Development and Assessment of New Drugs and Technologies?” *Supplement to Journal of Managed Care Pharmacy* 18(5) (June 2012): S5 – S11.

**BACKGROUND:** Comparative effectiveness research (CER) has been proposed in the United States as a way to compare new drugs and technologies with established alternatives and determine not just whether a therapy works, but how well it works compared to other options.

**OBJECTIVES:** To define the current use of CER in the development of new drugs and technologies and explore what is needed for this research approach to reduce or stabilize health care costs in the United States.

**SUMMARY:** In 2010, the Patient-Centered Outcomes Research Institute (PCORI) was established by the Patient Protection and Affordable Care Act (PPACA) to coordinate federally funded CER and recommend research priorities. Hochman and McCormick’s (2010) evaluation of 328 randomized trials, observational studies, and meta-analyses involving medications published between June 2008 and September 2009 in 6 key journals showed that most published research did not fulfill the criteria of CER (defined as comparison to active treatment) and that most study design is driven by FDA requirements rather than the need to develop evidence to facilitate selection of the most effective therapy. Since PPACA provides alternative funding for CER, it could encourage funding more studies to help determine which treatment delivers the best value per unit of investment from clinical, humanistic, and economic perspectives. Manufacturers may avoid CER because it increases product development costs, but a drug proven more effective is more likely to be accepted by formulary committees, increasing the drug’s market share, whereas payers may reject or limit use of a new drug that performs less effectively in comparative studies.

**CONCLUSIONS:** Comparative effectiveness research (CER) may not directly reduce expenditures for drugs and medical technologies. The results may vary widely from case to case; however, despite often significantly higher prices for new drugs, it is important to look beyond product costs to the overall impact on health care costs, including medical cost offsets that may occur through improved health or decreased morbidity. To truly decrease cost and improve quality, cost-effectiveness will have to be integrated into CER with the objective of prioritizing efficient therapies in the real-world health care system. If the methods and output of CER improve, the resulting cost-effectiveness ratios will also be more useful to the payer. CER should ultimately, therefore, be a useful tool to help patients, providers, and decision makers provide the most effective and most cost-effective interventions.

Field, T. S. et al., “The Costs Associated With Adverse Drug Events Among Older Adults in the Ambulatory Setting” *Medical Care* 43 (2005): 1171 - 1176

**Results:** For all adverse drug events, the increase in post event costs over the pre-event period was $1310 (95% confidence interval [CI], $625–$1995) greater for those experiencing an adverse drug event than the comparison group after controlling for age, sex, comorbidity, number of scheduled medications, and having been hospitalized during the pre-event period. For preventable adverse drug events, the adjusted increase was $1983 (95% CI, $193–$3773) greater for cases. Based on rates of adverse drug events and these cost estimates, 1000 older adults would have annual costs related to adverse drug events in the ambulatory setting of $65,631 with $27,365 of this associated with preventable events.

**Conclusions:** Adverse drug events in the ambulatory setting substantially increase the healthcare costs of elderly persons.

Chisholm-Burns, M. A., et al., “Economic effects of pharmacists on health outcomes in the United States: A systematic review” *American Journal of Health-System Pharmacy* 67 (2010): 1624 – 1634.

**Conclusion:** A majority of studies examining the economic effects of pharmacist provided direct patient care in the United States were limited by their partial cost analyses, study design, and other analysis considerations. A majority of the 20 studies

that found positive economic benefits examined pharmacists’ interventions involving

technical methods or multimodal approaches.

Johnson, J. A. and J. L. Bootman. “Drug-Related Morbidity and Mortality” *Archives of Internal Medicine* 155 (1995): 1949 – 1956.

**Results:** Drug-related morbidity and mortality was estimated to cost $76.6 billion in the ambulatory setting in the United States. The largest component of this total cost was associated with drug-related hospitalizations. When assumptions of the model were varied, the estimated cost ranged from a conservative estimate of $30.1 to $136.8 billion in a worst-case scenario.

**Conclusions:** The cost of drug-related morbidity and mortality in the ambulatory setting in the United States is considerable and should be considered in health policy decisions with regard to pharmaceutical benefits. Policies and services should be developed to reduce and prevent drug-related morbidity and mortality.

[Pharmacy Effect on Adherence to Antidiabetic Medications (link to DM)](#Antidiabetic)

[Evaluation of outcomes of a medication therapy management program for patients with diabetes](#Pinto) (link to DM)

Moczygemba, L..R., J.C. Barner, and E. R. Gabrillo “Outcomes of a Medicare Part D telephone medication therapy management program” *Journal of the American Pharmacists Association* 52 (2012): 144 - 152.

**Conclusion:** A telephone MTM program reduced MHRPs. Unadjusted cost comparisons showed cost savings in the intervention group. Future research should focus on understanding how telephone MTM affects medication adherence.

Parente, S.T., et al., “Effects of a Consumer Driven Health Plan on Pharmaceutical Spending and Utilization” *Health Services Research Journal* 39(4 pt 2) (August 2004): 1189–1210.

**CONCLUSION:** Drug spending in the CDHP is cost-neutral to cost-saving compared with three-tier benefits with no major differences in brand name drug use. We find limited evidence of less drug consumption by CDHP enrollees with chronic illnesses, and some evidence of less generic drug use and more mail-order drug use among CDHP members. As the CDHP market evolves, the empirical evidence ‘‘engaging the consumer’’ in prescription drug coverage appears to be plausible, but not yet overwhelming.

Rodin, H. A., et al., “Plan Designs That Encourage the Use of Generic Drugs Over Brand-Name Drugs: An Analysis of a Free Generic Benefit” *American Journal of Managed Care* 15(12) (2009): 881 – 888.

**Results:** The rate of switching from brand-name drugs to generic drugs in the intervention group was not statistically different from that in the control group. The net change in adherence was higher only for the intervention group patients taking statins who switched to generic drugs, a 6.2% increase compared with an 8.5% decrease

in the control group. The estimate of medical cost savings attributable to this benefit change was significant for only the metformin class of diabetes drugs. Improved adherence independent of this benefit change was estimated to reduce all-cause medical costs for patients taking sulfonylureas, metformin, and thiazolidinediones.

Conclusions: Altering copayments for pharmaceuticals may affect the rate of conversion to generic drugs but is unlikely in and of itself to result in complete conversion. However, increasing adherence can result in net savings for specific diabetic drug classes, as savings from all-cause medical costs offset the increase in pharmacy costs.

Brummel, A. R., et al., “Optimal Diabetes Care Outcomes Following Face-to-Face

Medication Therapy Management Services” *Population Health Management* 16 (2103): 28 – 34.

Pharmacists play an integral role in influencing resolution of drug-related problems. This study examines the relationship between a pharmacist-led and delivered medication therapy management (MTM) program and achievement of Optimal Diabetes Care benchmarks. Data within Fairview Pharmacy Services were used to identify a group of patients with diabetes who received MTM services during a 2007 demonstration project

(n = 121) and a control group who were invited to receive MTM services but opted out (n = 103). Rates of achieving optimal diabetes clinical management for both groups were compared using the D5 diabetes measure for years 2006, 2007, and 2008. The D5 components are: glycosolated hemoglobin (HbA1c < 7%); low-density lipoprotein ( < 100 mg/dl); blood pressure ( < 130/80mmHg); tobacco free; and daily aspirin use. Multivariate difference-in-differences (DID) estimation was used to determine the impact of 1 year of MTM services on each care component. Patients who opted in for MTM had higher Charlson scores, more complex medication regimens, and a higher percentage of diabetes with complications (P < 0.05). In 2007, the percentage of diabetes

patients optimally managed was significantly higher for MTM patients compared to 2006 values (21.49% vs. 45.45%, P < 0.01). Nonlinear DID models showed that MTM patients were more likely to meet the HbA1c criterion in 2007 (odds ratio: 2.48, 95% confidence interval [CI]: 1.04–5.85, P = 0.038). Linear DID models for HbA1c showed a mean reduction of 0.54% (95% CI: 0.091%–0.98%, P = 0.018) for MTM patients. An MTM program contributed to improved optimal diabetes management in a population of patients with complex diabetes clinical profiles.

**Conclusion:** In summary, this study suggests that a pharmacist-led and delivered MTM program has the potential to improve optimal diabetes management rates in a population of complex diabetes patients. Therefore, policies at the federal and local

levels should be designed to increase patient access to MTM services.

Patwardhan, A., et al., “The Value of Pharmacists in Health Care” *Population Health Management* 15 (2012): 157 – 162.

**Abstract:** The American health care system is concerned about the rise of chronic diseases and related resource challenges. Management of chronic disease traditionally has been provided by physicians and nurses. The growth of the care management industry, in which nurses provide remote telephonic monitoring and coaching, testifies to

the increasing need for care management and to the value of nonphysician clinicians. However, this model is challenged by a number of factors, including low enrollment and the growing shortage of nurses. The challenges to the traditional model are causing policy makers and payers to consider innovative models. One such model includes the pharmacist as an essential provider of care. Not only is the number of pharmacists growing, but they are playing an ever broader role in a variety of settings. This article broadly surveys the current state of pharmacist provision of care management services and highlights the increasingly proactive role played by Walgreen Co. toward this trend, using recently conducted research. Pharmacists are making a noticeable impact on and contribution to the care of chronic diseases by improving adherence to medications, a key factor in the improvement of outcomes. Literature also suggests that pharmacies are increasingly encouraging, expanding, and highlighting the role and contributions of their professional pharmacists. Although the role of the pharmacist in chronic care management is still developing, it is likely to grow in the future, given the needs of the health care system and patients.

The pharmacist can play a significant role in patient care, partnering with physicians and other clinicians to ensure adequate access and provision of care for patients. This team of providers can work together to lower medical costs, decrease hospitalizations, and ultimately improve the health and wellness of their patients.

Farley, J. F., et al., “Medication Adherence Changes Following Value-Based Insurance Design” *American Journal of Managed Care* 18(5) (2012): 265 – 274.

**Results:** VBID was associated with improved medication adherence ranging from 1.4% to 3.2% at 1 year, which increased to 2.1% to 5.2% 2 years following VBID adoption. Adherence changes were most notable among patients who were nonadherent (MPR <.50) before VBID implementation.

**Conclusions:** Population-based implementation of VBID can improve adherence to medications to treat cardiometabolic conditions, particularly for previously nonadherent patients. VBID guidelines being developed in response to healthcare reform should account for the heterogeneity in patient response to VBID programs.

**Gaps In Care**

Greiver, M., et al., “Implementation of electronic medical records. Effect on the provision of preventive services in a pay-for-performance environment”. *Canadian Family Physician* 57 (2011) 381 – 389.

**Objective** To study the effect of electronic medical record (EMR) implementation on preventive services covered by Ontario’s pay-for-performance program.

**Design** Prospective double-cohort study.

**Participants** Twenty-seven community-based family physicians.

**Setting** Toronto, Ontario

**Intervention** Eighteen physicians implemented EMRs, while 9 physicians continued to use paper records.

**Main outcome measure** Provision of 4 preventive services affected by pay-for-performance incentives (Papanicolaou tests, screening mammograms, fecal occult blood testing, and influenza vaccinations) in the first 2 years of EMR implementation.

**Results** After adjustment, combined preventive services for the EMR group increased by 0.7%, a smaller increase than that seen in the non-EMR group (P = .55, 95% confidence interval -2.8 to 3.9).

**Conclusion** When compared with paper records, EMR implementation had no significant effect on the provision of the 4 preventive services studied.

Oswald, J. W., et al., “Population Level Impacts of a Gaps in Care Mailing Program”. *OptumHealth Care Solutions* (February 2009)

**Abstract**

OptumHealth’s Gaps in Care program uses health insurance claims to identify members

who have missed opportunities to receive recommended medical care or save money

on health care. Information about these opportunities is mailed to the member and their

physicians. This analysis evaluates the improvement in clinical compliance and associated cost savings delivered by the Gaps in Care program. Gap closures and health care costs were compared for over 400,000 Gaps in Care intervention participants and a control group of 88,000. Results showed 55% of individuals in the intervention group closed all their Evidence Based Medicine (EBM) gaps as compared to 35% of individuals in the control group. This suggests a 20% incremental increase in individuals closing their EBM gaps and an estimated savings up to $1.49 PMPM across the entire intervention population.

**TeleMedicine**

*See*[Leticia R. Moczygemba, PharmD, PhD; Jamie C. Barner, PhD; Kenneth A. Lawson, PhD;](#Impact)

[Carolyn M. Brown, PhD; Evelyn R. Gabrillo, PharmD; Paul Godley, PharmD; and](#Impact)

[Michael Johnsrud, PhD “Impact of Telephone Medication Therapy Management on Medication and Health-Related Problems, Medication Adherence, and Medicare Part D Drug Costs: A 6-Month Follow Up”. The American Journal of Geriatric Pharmacotherapy; Volume 9 Number 5 (October 2011): 328 – 338.](#Impact) *under Non Traditional*

Hughes-Cromwick, S. B., et al., “[Cost-effectiveness of telephonic disease management in heart failure.”](http://ovidsp.tx.ovid.com.proxy.library.georgetown.edu/sp-3.8.0b/ovidweb.cgi?&S=KKEJFPAICJDDECLONCPKIDLBNMHJAA00&Complete+Reference=S.sh.44%7c2%7c1) *American Journal of Managed Care* 14(2) (Feb 2008): 106 - 15.

**OBJECTIVE:** To evaluate the cost-effectiveness of a telephonic disease management (DM) intervention in heart failure (HF).

**STUDY DESIGN**: Randomized controlled trial of telephonic DM among 1069 community-dwelling patients with systolic HF (SHF) and diastolic HF performed between 1999 and 2003. The enrollment period was 18 months per subject.

**METHODS:** Bootstrap-resampled incremental cost-effectiveness ratios (ICERs) were computed and compared across groups. Direct medical costs were obtained from a medical record review that collected records from 92% of patients; 66% of records requested were obtained.

**RESULTS**: Disease management produced statistically significant survival advantages among all patients (17.4 days, P = .04), among patients with New York Heart Association (NYHA) class III/IV symptoms (47.7 days, P = .02), and among patients with SHF (24.2 days, P = .01). Analyses of direct medical and intervention costs showed no cost savings associated with the intervention. For all patients and considering all-cause medical care, the ICER was $146 870 per quality-adjusted life-year (QALY) gained, while for patients with NYHA class III/IV symptoms and patients with SHF, the ICERs were $67 784 and $95 721 per QALY gained, respectively. Costs per QALY gained were $101 120 for all patients, $72 501 for patients with SHF, and $41 348 for patients with NYHA class III/IV symptoms.

**CONCLUSIONS:** The intervention was effective but costly to implement and did not reduce utilization. It may not be cost-effective in other broadly representative samples of patients. However, with program cost reductions and proper targeting, this program may produce life-span increases at costs that are less than $100 000 per QALY gained.

Ward, M. A. and Y. Xu, “[Pharmacist-provided telephonic medication therapy management in an MAPD plan.](http://ovidsp.tx.ovid.com.proxy.library.georgetown.edu/sp-3.8.0b/ovidweb.cgi?&S=KKEJFPAICJDDECLONCPKIDLBNMHJAA00&Complete+Reference=S.sh.44%7c5%7c1)” American Journal of Managed Care 17(10) (October 2011) 399 – 409.

**OBJECTIVES:** To evaluate the impact of a pharmacist-provided telephonic medication therapy management program (MTMP) on drug, medical, and total expenditures in a Medicare Advantage Prescription Drug (MAPD) plan population from the perspective of the health plan sponsor.

**STUDY DESIGN:** Prepost analysis with a matched control group. METHODS: The intervention group was composed of MTMP-eligible MAPD members who received a pharmacist-provided telephonic consultation during the first quarter of 2008. Propensity score matching was used to select a matched control group among the remaining pool of MTMP-eligible MAPD members who did not receive a pharmacist-provided telephonic or face-to-face MTMP consultation in 2008. All-cause healthcare spending was determined before and after an intervention period for the MTMP consultation and control groups. A difference-in-difference analysis was performed to assess the impact of MTMP consultation on all-cause healthcare spending.

**RESULTS:** A total of 432 MTMP-eligible MAPD members who received an intervention were matched to a comparison group of 432 members. The MTMP consultation group and the comparison group had different unadjusted total expenditures after intervention. The MTMP consultation group had an average of $3680 less per member in the postintervention period compared with the preintervention period, while the matched comparison group had an average of $393 more in the postintervention period compared with the preintervention period. Results from difference-in-difference regression analyses suggest that MTMP consultation was associated with lower total expenditures after adjusting for other baseline covariates.

**CONCLUSIONS:** Pharmacist-provided telephonic MTMP consultations can lead to decreases in total all-cause healthcare expenditures.

Weintraub, A., et al., “A Multicenter Randomized Controlled Evaluation of Automated Home Monitoring and Telephonic Disease Management in Patients Recently Hospitalized for Congestive Heart Failure: The SPAN-CHF II Trial”. *Journal of Cardiac Failure* 16 (4) (2010) 285 – 292.

**Background:** We performed a prospective, randomized investigation assessing the incremental effect of automated health monitoring (AHM) technology over and above that of a previously described nurse directed heart failure (HF) disease management program. The AHM system measured and transmitted body weight, blood pressure, and heart rate data as well as subjective patient self-assessments via a standard telephone line to a central server.

**Methods and Results:** A total of 188 consented and eligible patients were randomized between intervention and control groups in 1:1 ratio. Subjects randomized to the control arm received the Specialized Primary and Networked Care in Heart Failure (SPAN-CHF) heart failure disease management program. Subjects randomized to the intervention arm received the SPAN-CHF disease management program in conjunction with the AHM system. The primary end point was prespecified as the relative event rate of HF hospitalization between intervention and control groups at 90 days. The relative event rate of HF hospitalization for the intervention group compared with controls was 0.50 (95%CI [0.25e0.99], P 5 .05).

**Conclusions:** Short-term reductions in the heart failure hospitalization rate were associated with the use of automated home monitoring equipment. Long-term benefits in this model remain to be studied.

“Telemedicine: opportunities and developments in Member States: report on the second global survey on eHealth” *Global Observatory for eHealth Series* 2 (2009).

??? multiple studies combined….may be worth a peek. Not sure how to document here. On flash drive Under Chapter 4 > Telemedicine > goe\_telemedicine\_2010\_WHO

Or

http://www.who.int/goe/publications/goe\_telemedicine\_2010.pdf

Wakefield, B. J., et al., “Outcomes of a Home Telehealth Intervention for Patients with Diabetes and Hypertension” Telemedicine And E-Health 18(8) (October 2012): 575 – 579.

**Background:** Home telehealth programs often focus on a single disease, yet many patients who need monitoring have multiple conditions. This study evaluated secondary outcomes from a clinical trial evaluating the efficacy of home telehealth to improve

outcomes of patients with co-morbid diabetes and hypertension.

**Subjects and Methods:** A single-center randomized controlled clinical trial compared two remote monitoring intensity levels (low and high) and usual care in patients with type 2 diabetes and hypertension being treated in primary care. Secondary outcomes

assessed were knowledge (diabetes, hypertension, medications), self-efficacy, adherence (diabetes, medications), and patient perceptions of the intervention mode.

**Results:** Knowledge scores improved in the high-intensity intervention group participants, but upon further analysis, we found the intervention effect was not mediated by gain in knowledge. No significant differences were found across the groups in self-efficacy, adherence, or patient perceptions of the intervention mode.

**Conclusions:** Home telehealth can enhance detection of key clinical symptoms that occur between regular physician visits. While our intervention improved glycemic

and blood pressure control, the mechanism of the effect for this improvement was not clear.

van den Berg, N., et al., “Telemedicine and telecare for older patients—A systematic review”. *Maturitas* 73 (2012): 94– 114.

Telemedicine is increasingly becoming a reality in medical care for the elderly. We performed a systematic literature review on telemedicine healthcare concepts for older patients. We included controlled studies in an ambulant setting that analyzed telemedicine interventions involving patients aged ≥60 years. 1585 articles matched the specified search criteria, thereof, 68 could be included in the review. Applications address an array of mostly frequent diseases, e.g. cardiovascular disease (N = 37) or diabetes (N = 18). The majority of patients is still living at home and is able to handle the telemedicine devices by themselves. In 59 of 68 articles (87%), the intervention can be categorized as monitoring. The largest proportion of telemedicine interventions consisted of measurements of vital signs combined with personal interaction between healthcare provider and patient (N = 24), and concepts with only personal interaction (telephone or videoconferencing, N = 14). The studies show predominantly positive results with a clear trend towards better results for “behavioral” endpoints, e.g. adherence to medication or diet, and self-efficacy compared to results for medical outcomes (e.g. blood pressure, or mortality), quality of life, and economic outcomes (e.g. costs or hospitalization). However, in 26 of 68 included studies, patients with characteristic limitations for older patients (e.g. cognitive and visual impairment, communication barriers, hearing problems) were excluded. A considerable number of projects use rather sophisticated technology (e.g. videoconferencing), limit-ing ready translation into routine care. Future research should focus on how to adapt systems to the individual needs and resources of elderly patients within the specific frameworks of the respective national healthcare systems.

**Conclusion:** Telemedicine is already a reality and a prospect for medical care in the increasing population of the elderly. This review shows that, although telemedical healthcare concepts have been positively evaluated in most published studies, the development of concepts, systems, and devices suitable for older patients still needs to be intensified. Instead of following only technical possibilities and developments, the strategy of developing telemedical concepts has to follow the development in healthcare and the needs of patients and healthcare professionals. A combination of technical devices and personal interaction with healthcare professionals provides promising results, especially in monitoring and supporting behavioral changes of the patients. Telemedicine healthcare concepts can play a future role in regional care concepts to support intensive monitoring of older patients, mostly with chronic diseases but some of the included studies have shown, that also short-time monitoring, e.g. after surgery, is possible. An important theme question for future research is how to adapt technical systems and processes to the needs and resources of patients with cognitive and physi-cal limitations and comorbidities, to make telemedicine healthcare concepts suitable and available for a larger group of older patients.

Palmas, W., et al., “A Randomized Trial Comparing Telemedicine Case Management with Usual Care in Older, Ethnically Diverse, Medically Underserved Patients with Diabetes Mellitus: 5 Year Results of the IDEATel Study” *Journal of the American Medical Informatics Association* 16(4) (July–August 2009): 446–456.

**Context:** Telemedicine is a promising but largely unproven technology for providing case management services to patients with chronic conditions and lower access to care.

**Objectives:** To examine the effectiveness of a telemedicine intervention to achieve clinical management goals in older, ethnically diverse, medically underserved patients with diabetes.

**Design, Setting, and Patients:** A randomized controlled trial was conducted, comparing telemedicine case management to usual care, with blinded outcome evaluation, in 1,665 Medicare recipients with diabetes, aged ≥ 55 years, residing in

federally designated medically underserved areas of New York State.

**Interventions:** Home telemedicine unit with nurse case management versus usual care.

**Main Outcome Measures:** The primary endpoints assessed over 5 years of follow-up were hemoglobin A1c (HgbA1c), low density lipoprotein (LDL) cholesterol, and blood pressure levels.

**Results:** Intention-to-treat mixed models showed that telemedicine achieved net overall reductions over five years of follow-up in the primary endpoints (HgbA1c, p = 0.001; LDL, p < 0.001; systolic and diastolic blood pressure, p = 0.024; p < 0.001). Estimated differences (95% CI) in year 5 were 0.29 (0.12, 0.46)% for HgbA1c, 3.84 (−0.08, 7.77) mg/dL for LDL cholesterol, and 4.32 (1.93, 6.72) mm Hg for systolic and 2.64 (1.53, 3.74) mm Hg for diastolic blood pressure. There were 176 deaths in the intervention group and 169 in the usual care group (hazard ratio 1.01 [0.82, 1.24]).

**Conclusions:** Telemedicine case management resulted in net improvements in HgbA1c, LDL-cholesterol and blood pressure levels over 5 years in medically underserved Medicare beneficiaries. Mortality was not different between the groups, although power was limited.

McConnochie, K. M., et al., “Acute Illness Care Patterns Change With Use of Telemedicine” *Pediatrics* 123(6) (2009): 989 – 995.

**OBJECTIVE.** Health-e-Access, a telemedicine service providing care for acute illnesses in children, has delivered \_6500 telemedicine visits from 10 primary care practices in

Rochester, New York, by using telemedicine access at 22 child care and school sites.

The goal was to assess the hypotheses that children served by Health-e-Access received health care more often for acute illnesses but had fewer emergency department (ED) visits and lower health care expenditures than did children without access through this service.

**METHODS.** By using insurance claims, this case study compared utilization (starting in

May 2001) of telemedicine, office, or ED care for children with versus without

telemedicine access. Children included in analyses had ≥ 6 consecutive insurance covered months through July 2007. Claims data captured all utilization. A total of

19,652 child-months from 1,216 children with telemedicine access were matched

with respect to age, gender, socioeconomic status, and season with child-months for

children without telemedicine availability.

**RESULTS.** The mean age at utilization was 6.71 years, with 79% of all child-months

being covered by Medicaid managed care. The overall utilization rate was 305.1 visits

per 100 child-years. In multivariate analyses with adjustment for potential confounders,

overall illness-related utilization rates (in-person or telemedicine visits per 100 child-years) for all sites were 23.5% greater for children with telemedicine access than for control children, but ED utilization was 22.2% less.

**CONCLUSION.** The Health-e-Access telemedicine model holds potential to reduce health care costs, mostly through replacement of ED visits for nonemergency problems.

Wennberg, D. E., et al., “A Randomized Trial of a Telephone Care-Management Strategy”. *New England Journal of Medicine* 363(13) (2010):1245-55.

**Background:** Studies have shown that telephone interventions designed to promote patients’ self management skills and improve patient–physician communication can increase patients’ satisfaction and their use of preventive services. The effect of such a strategy on health care costs remains controversial.

**Methods:** We conducted a stratified, randomized study of 174,120 subjects to assess the effect of a telephone-based care-management strategy on medical costs and resource utilization. Health coaches contacted subjects with selected medical conditions and predicted high health care costs to instruct them about shared decision making, self-care, and behavioral change. The subjects were randomly assigned to either a usual-support group or an enhanced-support group. Although the same telephone intervention was delivered to the two groups, a greater number of subjects in the enhanced-support group were made eligible for coaching through the lowering of cutoff points for predicted future costs and expansion of the number of qualifying health conditions. Primary outcome measures at 1 year were total medical costs and number of hospital admissions.

**Results:** At baseline, medical costs and resource utilization were similar in the two groups. After 12 months, 10.4% of the enhanced-support group and 3.7% of the usual-support group received the telephone intervention. The average monthly medical and

pharmacy costs per person in the enhanced-support group were 3.6% ($7.96) lower

than those in the usual-support group ($213.82 vs. $221.78, P = 0.05); a 10.1% reduction in annual hospital admissions (P<0.001) accounted for the majority of savings.

The cost of this intervention program was less than $2.00 per person per month.

**Conclusions:** A targeted telephone care-management program was successful in reducing medical costs and hospitalizations in this population-based study.

[Schechter CB, Cohen HW, Shmukler C, Walker EA, “Intervention Costs and Cost-Effectiveness of a Successful Telephonic Intervention to Promote Diabetes Control” Diabetes Care Volume 35 number 11 (November 2012): 2156 – 2160. (Link to Case Management)](#Schechter)

**Bundled Payment**

*See*  [“Lessons from Medicare’s Demonstration Projects on Disease Management, Care Coordination, and Value-Based Payment” Congressional Budget Office. Issue Brief. January 2012.](#Lessons)  *under Disease Management*

Miller, H. D. “From Volume To Value: Better Ways To Pay For Health Care”. *Health Affairs* 28(5) (2009):1418-1428.

**ABSTRACT:** Payment systems for health care today are based on rewarding volume, not value for the money spent. Two proposed methods of payment, “episode-of-care payment” and “comprehensive care payment” (condition-adjusted capitation), could facilitate higher quality and lower cost by avoiding the problems of both fee-for-service payment and traditional capitation. The most appropriate payment systems for different types of patient conditions and some methods of addressing design and implementation issues are discussed. Although the new payment systems are desirable, many providers are not organized to accept or use them, so transitional approaches such as “virtual bundling,” described in this paper, will be needed.

Providers will need to change their internal processes, methods of coordination, and even organizational structures to actually create better care. In addition, benefit structures for patients may need to be changed, and quality measurement and reporting systems will need to be organized or expanded in each community.

This cannot happen instantaneously, so a transition process will be needed in payment systems (Exhibit 4), rather than trying to move immediately to the ideal, long-run structure. For example, the virtual bundling systems described earlier could be used as transitional steps while providers are organizing themselves to accept full episode-of-care or comprehensive care payments. Although this “coevolution” could take longer than might be desirable, it could have a higher probability of long-run success.

Altman, S. H. “The Lessons Of Medicare’s Prospective Payment System Show That The Bundled Payment Program Faces Challenges” *Health Affairs* 31(9) (2012): 1923–1930.

**ABSTRACT** Policy makers have been trying to replace Medicare’s fee-for service payment system for years with approaches that pay one price for an aggregation of services. The intent is to reward providers for offering needed care in the most appropriate and cost-effective manner. Medicare’s first payment change designed to accomplish such a change was the hospital prospective payment system, introduced during 1983–84. But because it focused only on hospital care, its impact on total Medicare spending was limited. In 2011 Medicare began a new initiative to expand

the “bundled payment” concept to link payments for multiple services that patients receive during an episode of care. The goal of Medicare’s current bundled payment initiative is to provide incentives to deliver health care more efficiently while maintaining or improving quality. This article provides a detailed analysis of how Medicare implemented the hospital prospective payment system, how hospitals responded to the new incentives, and lessons learned that are applicable to the bundled payment initiative. The lessons include that any Medicare payment reform needs to continuously respond to the many different components of the health system and that payment reform should be coupled with analogous reforms in private insurance payment, so that providers receive consistent signals to alter their behavior.

There is reason to be optimistic. However, the experiences of the prospective payment system suggest that unless payment reform is matched by budget constraints, the likely impact on lowering costs will be limited. There is also the cautionary note that if payment and delivery system changes are combined too quickly with reductions in revenue, the backlash from providers and patients could sabotage the program. Finally,

the prospective payment system experience reinforces the view that Medicare payment

reform should be combined with private insurance payment reform if we are to witness the full benefit of lowering health care spending.

Robinson, J.C., et al., “Measurement Of And Reward For Efficiency In California’s Pay-For-Performance Program How the Integrated Healthcare Association discovered the problems of using “episodes of care” as the basis for physician performance rewards.” *Health Affairs* 28(5) (2009):1438 – 1447.

**ABSTRACT**: Pay-for-performance (P4P) programs are expanding their purview from quality to include efficiency, and many consider the episode of care as the appropriate unit of measurement. Two years’ experience by the California P4P program, however, reveals that the requisite claims data often are incomplete or poorly coded and that even large physician groups have too few patients experiencing most types of episodes to permit statistically valid measurement for public reporting and incentive payment. The California P4P program is shifting its efficiency focus to metrics not reliant on episode measurement while shifting episode measurement to supporting bundled payment for acute surgical and medical interventions.

Payment incentives create powerful but blunt tools for improving performance in health care. Retrospective methods such as fee-for-service undermine incentives for providers to do the hard work of improving efficiency and slow the otherwise rapid growth in use and spending. Prospective methods such as capitation create incentives for efficiency but provide no guidance for how to achieve it, and they can motivate providers to avoid patients most in need of resources. Despite high hopes, performance reward based on episodes of care has proved to be limited by problems of sample size and data completeness. The use of the episode of care as the basis for a bundled provider payment method is not subject to the problems of small numbers of patients in each episode type at each provider organization, although it does face other problems, such as how to allocate the bundled payment across the participants in each episode of care. Until data systems and organizational structures evolve to overcome these limitations, episode measurement and payment validly can be used for judiciously chosen procedures in judiciously chosen settings, but not for more.

Robinow, A. “The Potential Of Global Payment: Insights From The Field” *The Commonwealth Fund* 1373 (February 2010).

**ABSTRACT:** Increasing awareness of cost and quality problems caused by the prevailing fee-for-service payment system has led to a reemergence of interest in payment models that build on the capitation approach, generally referred to as global payment. This project interviewed and surveyed physician leaders of small and large organizations, as well as other industry experts with experience with managed care in a variety of global payment arrangements, to glean insights into global payment successes and failures. Results showed that many issues plaguing capitation pay­ment programs in the 80s and 90s have largely been resolved and that physicians and industry leaders felt that cost reductions of 20 percent to 30 percent are achievable under well-constructed global payment models, while improving quality of care. Industry experts strongly recommended that a range of global payment structures be phased in and applied to both large and small physi­cian entities.

**SUMMARY AND CONCLUSIONS:** The individuals interviewed for this paper had a wide range of national and international experi­ence and expertise. Without exception, they felt strongly that to deliver better health care value it is essential that most provider reimbursement occur under the broad rubric of global payment. Provider payment based on total cost of care should be coupled with payment structures that rec­ognize the outcomes of care, ideally based on functional outcomes rather than processes of care or intermediate outcomes.

Not everyone is, or should be, guaranteed success in this new world of incentives. Smaller physician practices can succeed in a market organized around global payment. Vehicles exist and more will emerge for providers of all shapes and sizes to participate. But, even in a staged transi­tion to global payment, some providers may not prosper in this environment. Not all primary care providers will respond effectively to this change in incentives, and better management of patient care is expected to generate a surplus of hospitals and specialists that will need to be redeployed.

CMS must lead. Opinions were very clear and consistent that, in the absence of appropriate ac­tions by CMS, the private market could not drive enough change. Conversely, several interview subjects stated that if CMS redefined its payment model in a meaningful way, the health care de­livery world would respond quickly to the new incentives. Even though these experts agreed that a multiyear transition period would be important to delivery system stability, knowing in advance how they will be paid at the end of the transition period would have a dramatic, transformative effect on the delivery system, creating opportunities for innovation and improvement.

Providers and plans will need time to transition into their new roles. Moving to a global pay­ment-dominated health care delivery market requires profound changes in thinking and behavior for provider and plan organizations and individuals. Making the transition while limiting disrup­tion will require lead time as well as access to supporting resources.

Primary care capacity is the cornerstone of change. Improvements in primary care working conditions and rewards are necessary to ensure adequate supply. Methods for optimizing pri­mary physician capacity include those that could free up physician time (e.g., efficiencies from fully implemented electronic medical records, and better use of physician extenders), but these changes will only occur if the economics can support them. There is an expectation that wide­spread use of global payment models will result in excess specialist capacity in some specialty types. Some of those specialists may redeploy into primary care.

A number of approaches to global payment should be designed and supported. The details of how global payments are designed and implemented are less important than the alignment of incentives and ability to innovate to improve cost and quality. Design and administrative details should remain flexible to allow a variety of provider types and sizes to operate under global pay­ment models. The use of risk-limiting approaches is important to enabling global payment to be used across the widest possible segment of the health care delivery system, but the infinite per­mutations of these variables could be more standardized. For example, global payment arrange­ments could come standard with risk adjustment applied, but could have a set of reinsurance options, based on the needs of the provider group. Or a more common approach to determining which services are included in the global payment could be established, coupled with a choice of several preestablished levels of up- and downside risk-limiting corridors.

Bring back the FTC. Global payment models are expected to drive provider consolidation, with attendant pros and cons. It is important to ensure that the positive aspects of consolidation and integration are encouraged, while excess market power and solidification of excessively high costs are avoided.

Though not easy, the public consciousness of what constitutes value in health care needs to be raised. It is not yet clear how to engage the public in an unbiased, nonpoliticized discussion of the value of health care interventions and the tradeoffs involved in health care spending. Fears of withholding necessary care in the presence of incentives to manage cost are widespread. As providers take on more risk, animosity toward insurance companies may transfer to providers. It is essential to align patient incentives to engage in value decisions about care and commit to ac­tions to support their health.

Without the improved incentives for cost and quality performance that will come with global payment, experts expressed deep concerns that other health reforms that bring more indi­viduals into our existing system will exacerbate existing cost problems.

Grabowski, D. C., et al., “Medicare Postacute Care Payment Reforms Have Potential To Improve Efficiency Of Care, But May Need Changes To Cut Costs” *Health Affairs* 31(9) (2012): 1941–1950.

**ABSTRACT**: The Affordable Care Act mandates changes in payment policies for Medicare postacute care services intended to contain spending in the long run and help ensure the program’s financial sustainability. In addition to reducing annual payment increases to providers under the existing prospective payment systems, the act calls for demonstration projects of bundled payment, accountable care organizations, and other strategies to promote care coordination and reduce spending. Experience with the adoption of Medicare prospective payment systems in postacute care settings approximately a decade ago suggests that current reforms could, but need not necessarily, produce such undesirable effects as decreased access for less profitable patients, poorer patient outcomes, and only short-lived curbs on spending. Policy makers will need to be vigilant in monitoring the impact of the Affordable Care Act reforms and be prepared to amend policies as necessary to ensure that the reforms exert persistent controls on spending without compromising the delivery of patient-appropriate postacute services.

Several current reforms, such as bundled payments and accountable care organizations, show promise for lowering the long-run spending trajectory. Unlike the postacute prospective payment reforms, these policies include multiple settings, have strict update rules, and are politically sustainable. However, experience amply demonstrates that persistent cost containment is not a given. Thus, policy makers will need to be vigilant in monitoring the rate of growth and be prepared to amend payment policies as necessary to achieve long-term containment of spending and longer term

financial sustainability for Medicare. Moreover, we need to continue to expand our understanding of the costs of care across each site, the services actually provided, and the benefit of the services given the patient’s condition.

“AHA Research Synthesis Report: Bundled Payment”. *American Hospital Association 2010 Committee on Research*

**Conclusion:** While the concept of bundled payment is appealing, implementation is complex. It is telling that so few bundled payment programs have been established over the past 20 years. However, current political support for bundled payment coupled with the growing evidence base may lead to more experimentation with bundled payment in the near future. Further advancement of bundled payment will depend on the will of payers and providers to collaborate in a new way and to address several challenging operational issues.

Casale, A. S., et al., ““ProvenCareSM” A Provider-Driven Pay-for-Performance Program for Acute Episodic” *Cardiac Surgical Care Annals of Surgery* 246(4) (October 2007): 613 – 623.

**Objective:** To test whether an integrated delivery system could successfully implement an evidence-based pay-for-performance program for coronary artery bypass graft (CABG) surgery.

**Methods:** The program consisted of 3 components: (1) establishing implementable best practices; (2) developing risk-based pricing; (3) establishing a mechanism for patient engagement. Surgeons reviewed all class I and IIa “2004 American Heart Association/

American College of Cardiology Guidelines for CABG Surgery” and translated them into 40 verifiable behaviors. These were imbedded within a new ProvenCareSM program and “hardwired” within the electronic health record system, including order sets, templates, and “time outs”. Concurrently preoperative, inpatient, and postoperative care within 90 days was packaged into a fixed price. A Patient Compact was developed to highlight the importance of patient activation. All elective CABG patients treated between February 2, 2006 and February 2, 2007 were included (ProvenCareSM Group) and compared with 137 patients treated in 2005 (Conventional Care Group).

**Results:** Initially, only 59% of patients received all 40 best practice components. At 3 months, program compliance reached 100%, but fell transiently to 86% over the next 3 months. Reliability subsequently increased to 100% and was sustained for the remainder of the study period. The overall trend in reliability was significant at P = 0.001. Thirty-day clinical outcomes showed improved trends (Table 1) but only the likelihood of discharge to home reached statistical significance. Length of stay decreased by 16% and mean hospital charges fell 5.2%.

**Conclusion:** A provider-driven pay-for-performance process for CABG, enabled by an electronic health record system, can reliably deliver evidence-based care, fundamentally alter reimbursement incentives, and may ultimately improve outcomes and reduce resource use.

Hussey, P. S., et al., “The PROMETHEUS Bundled Payment Experiment: Slow Start Shows Problems In Implementing New Payment Models” *Health Affairs* 30(11) (2011): 2116–2124.

**ABSTRACT** Fee-for-service payment is blamed for many of the problems observed in the US health care system. One of the leading alternative payment models proposed in the Affordable Care Act of 2010 is bundled payment, which provides payment for all of the care a patient needs over the course of a defined clinical episode, instead of paying for each discrete service. We evaluated the initial “road test” of PROMETHEUS Payment, one of several bundled payment pilot projects. The project has faced substantial implementation challenges, and none of the three pilot sites had executed contracts or made bundled payments as of May 2011.

The pilots have taken longer to set up than expected, primarily because of the complexity of the payment model and the fact that it builds on the existing fee-for-service payment system and other complexities of health care. Participants continue to see promise and value in the bundled payment model, but the pilot results suggest that the desired benefits of this and other payment reforms may take time and considerable effort to materialize.

**Conclusion:** Support for bundled payment now is based more on conceptual appeal than experience in practice or empirical evidence. The early implementation experiences of the PROMETHEUS road test support both positions: Participants continue to see promise and value in the bundled payment model, but they have not yet overcome many implementation challenges. The pilot has produced some preliminary benefits for its participants, providing hope that the model can address health care cost and quality problems.

However, the pilot results to date suggest that any benefits from bundled payment will take time and effort to materialize. The findings do not provide support for discarding bundled payment in favor of alternative payment methods. Many of the lessons learned from the pilot sites—such as the difficulty of adding complexity to an already complex system, agreeing to specific payment incentives, and redesigning care before large shifts in payment - are likely to apply to other payment and delivery reforms, including accountable care organizations and patient-centered medical homes. Indeed, the debate we observed about how payers and providers should share risk around episodes of care mirrors the current debate about the final form of accountable care organization risk-sharing regulations. Payment and delivery reform models may yet yield desired improvements in health care quality and spending, but notable gains may not come quickly or easily.

Hussey, P. S., et al., “Controlling U.S. Health Care Spending - Separating Promising from Unpromising Approaches” *New England Journal of Medicine* 361(22) (November 26, 2009): 2109 – 2111.

Because of the considerable uncertainty surrounding all options, better evaluation methods will be a critical adjunct to the experimentation that will be required. Today we have few nimble mechanisms for rapidly assessing the effects of a policy innovation. We need to develop strategies for effectively designing such interventions, evaluating them, and then deciding within an appropriate time frame whether to abandon them or systematically deploy them nationally.

Many “reforms” have worked in one place, but we have almost no examples of their successful replication. If we can develop a common set of tools for design, evaluation, and assessment, we will be able to move more quickly and effectively to reject or embrace policy solutions on the basis of the evidence.

**Coordinated Care**

Schore, J., et al., “Fourth Report to Congress on the Evaluation of the Medicare Coordinated Care Demonstration” *Mathematica Policy Research, Inc.* (March 2011).

**SUMMARY OF FINDINGS**

Overall, the two remaining projects (HQP and Mercy) successfully enrolled 2,965 beneficiaries in the research sample through September 30, 2007, and half were randomized to the treatment group and half to the control group. Mercy’s enrollees were, on average, much sicker than the Medicare fee-for-service population nationwide; HQP’s enrollees were similar to the fee-for-service population nationwide.

Neither program was cost effective overall, but results are promising for high-risk patients. Neither program achieved cost neutrality or net savings for all of its enrollees during the six and a half year period examined for this report (April 2002 through September 2008). However, for a subgroup of enrollees at greater risk of hospitalization and high costs, HQP generated savings for CMS of $397 per beneficiary per month after including the care coordination fee. Mercy’s treatment group had lower Part A and B costs than the control group, but the difference was not statistically significant (-$130, p=0.13) and the average monthly program fee paid over the period ($230) substantially exceeded this estimated savings in 15 Fourth Report to Congress on the Evaluation Mathematica Policy Research of the Medicare Coordinated Care Demonstration traditional Medicare expenditures. To summarize, while HQP generated savings for its high-risk patients, Mercy would have had to dramatically cut its fee or improve its effectiveness to have achieved cost neutrality. This high-risk subgroup, who had CHF, CAD, or COPD and at least one hospitalization in the year prior to enrollment, constitutes 14 percent of all Medicare beneficiaries in fee-for-service, and accounts for a disproportionate 30 percent of total Medicare expenditures in the year after identification.

The programs made limited improvements to the quality of care. Small sample sizes among disease-specific quality of care measures made it difficult to determine whether the programs improved quality of care unless the improvements were large. Among all patients, HQP improved 4 of 12 measures of receipt of preventive services and 1 of 9 measures of preventable adverse outcomes, and Mercy improved one measure of receipt of preventive services. In both programs the treatment group was significantly more likely than the control group to report that a health professional had explained to them how to take their medications properly. There were fewer measurable quality improvements among the high-risk patients, perhaps due to the smaller sample sizes. HQP’s treatment group mortality was 3.3 percentage points lower than its control group’s (p=0.02); Mercy’s treatment group’s mortality was 4.1 percentage points lower than its control group’s (the difference was not statistically significant). Among the high-risk group, the treatment groups had lower mortality rates than the control group, but the differences were not statistically significant, perhaps due to their substantially smaller sample sizes and corresponding lower statistical power than for the full sample.

Patients and providers were highly satisfied with the intervention. Based on earlier results from surveys of patients and providers, the programs were well received by both patients and providers.

Several features of the interventions appear to contribute to HQP’s and Mercy’s ability to reduce hospitalizations for the high-risk patients. The features of HQP and Mercy and two other MCCD programs that reduced hospitalizations were compared to the other seven MCCD programs. Using highly educated and experienced registered nurses to provide the right interventions to the right people appears to be the key to reducing hospitalizations. The successful programs were more likely to provide:

1. Face-to-face care coordinator contact with patients,

2. Face-to-face care coordinator contact with physicians,

3. Evidence-based patient education,

4. Management of care setting transitions,

5. Facilitation of communications across providers, and

6. Medication management.

**Pre-Authorization/Utilization Review**

Barlas, S. “Part D Changes for 2013 Will Put Pressure on P&T Committees: Drug Utilization Reviews and Medication Therapy Management Programs Under the Gun” *Pharmacy & Therapeutics* 37(6) (June 2012): 335 – 366.

Medicare made it clear it was looking for the next opportunity to make a regulatory change. Until then, it wants the LTC industry to make voluntary changes in the way it uses consultant pharmacists (1) either by adopting voluntary transparency measures such as (a) separate contracting for LTC consulting services from dispensing and other pharmacy services; (b) payment by LTC facilities of a fair market rate for consultant pharmacist services; and (c) disclosure by consultant pharmacists to the LTC facility of any affiliations that would pose potential conflicts of interest; or by (2) executing an integrity agreement by the consultant pharmacists. The ASCP has already endorsed conflict-of-interest disclosures to nursing homes, payment to consultant pharmacists at market rates, and the issuance of integrity statements by LTC pharmacies.

The widespread adoption of these measures would probably cool Medicare’s regulatory ardor a bit; however, the agency’s drive to improve Part D effectiveness and reduce Part D costs will result in a few more turns of the regulatory screw—on formulary policies, P&T committees, and pharmacists—when the agency proposes the 2014 Call Letter and its associated proposed rule, probably sometime at the end of this year.

Sanderson, B., F. Hollweck, and B. McMillan. “3 pillars of a successful denials management program” *Healthcare Financial Management* (September 2000): 74 – 80

The three pillars of a successful denials management and resolution program are:

* A denials database
* Standardized reports
* A standardized business office methodology to resolve denied accounts

At the academic health system, the implementation of these three key denials management pillars - denials database, standard reports, and standard resolution processes - has led to increased cash collections performance, reduced days in A/R, and a more productive staff.

Kapur, K., et al., “Managing Care: Utilization Review In Action At Two Capitated Medical Groups: Prospective denials of coverage on grounds of medical necessity are only a small part of the overall picture.” *Health Affairs - Web Exclusive* (June 2003): 275 – 282.

**ABSTRACT:** Despite widespread concern about denials of coverage by managed care organizations, little empirical information exists on the profile and outcomes of utilization review decisions. This study examines the outcomes of nearly a half-million coverage requests in two large medical groups that contract with health plans to deliver care and conduct utilization review. We found much higher denial rates than those previously reported. Denials were particularly common for emergency care and durable medical equipment. Retrospective requests were nearly four times more likely than prospective requests were to be denied, and when prospective requests were denied, it was more likely because the service fell outside the scope of covered benefits than because it was not medically necessary.

Denials made on contractual grounds—the largest share of denials—may call for both clinical and contractual expertise. Hence, they should ideally be made by personnel who are versant in both areas. There was some evidence of this sort of dual expertise being brought to bear on coverage decisions at the two groups we studied. However, for reasons of size or financial stress, this may be beyond the reach of many smaller medical groups that have assumed responsibility for UR, As MCOs in many parts of the country continue their evolution away from a command-and-control approach to utilization management and toward cost sharing with purchasers and enrollees, the future role of UR remains unsettled.

Although some form of UR seems certain to remain a fixture in many MCOs, the shift to consumer-centered strategies could alter the profile of both coverage denials and requests. For example, higher cost sharing may force overall declines in the volume of requests. In this environment, contractual coverage and medical-necessity issues that persist are likely to be for services that enrollees feel especially strongly about. Such consumer concerns, together with ongoing consumer protection agendas that include reforms such as guaranteed external review and right-to-sue provisions, mean that the policy importance of UR denials in managed care is unlikely to wane in the foreseeable future.

# [Delate, T](http://www.ncbi.nlm.nih.gov/pubmed?term=Delate%20T%5BAuthor%5D&cauthor=true&cauthor_uid=15697098)., et al., “Clinical and financial outcomes associated with a proton pump inhibitor prior-authorization program in a Medicaid population”. [*American Journal of Managed Care*](http://www.ncbi.nlm.nih.gov/pubmed/15697098) 11(1) (January 2005): 29 – 36.

**Objective:** To examine the clinical and financial outcomes associated with a proton pump inhibitor (PPI) prior-authorization policy.

**Study Design:** Interrupted time-series analyses of antisecretory prescription drug claims. Separate 6-month retrospective cohort analyses were conducted to estimate the clinical and financial effects of the policy.

**Patients And Methods:** More than 1.2 million Medicaid enrollees, with subgroup analyses of 5965 continuously eligible, potential antisecretory medication users. Measures included antisecretory drug expenditures, proportions of patients with at least 1 gastrointestinal diagnosis and gastrointestinal-related ambulatory and inpatient medical service visit, and subsequent gastrointestinal-related and total medical service expenditures.

**Results:** There was a 90.9% decrease in PPI per-member-per-month expenditures and a 223.2% increase in histamine2-receptor antagonist (H2A) per-member-per-month expenditures in the month immediately following the implementation of the policy (P < .001 for both). A greater proportion (80.7%) of prior-authorization eligible enrollees who received a PPI had at least 1 diagnosis for a gastrointestinal condition than enrollees who received an H2A (64.1%) or no antisecretory drugs (48.4%) (P < .001 for both). Two-part, finite mixture regression analyses indicated that the enrollees who received an H2A or no antisecretory drugs were no more likely to have incurred greater total medical care expenditures than enrollees who received a PPI.

**Conclusion:** Prior authorization for PPIs had the effect of reducing use of high-cost PPIs, while encouraging use of lower costing H2As without evidence of adverse medical consequences.

[Gleason P.P](http://www.ncbi.nlm.nih.gov/pubmed?term=Gleason%20PP%5BAuthor%5D&cauthor=true&cauthor_uid=16006271)., et al., “Medical and pharmacy expenditures after implementation of a cyclooxygenase-2 inhibitor prior authorization program.” [*Pharmacotherapy* 25(7) (July 2005)](http://www.ncbi.nlm.nih.gov/pubmed/16006271): 924 - 934.

**Study Objective:** To evaluate the effects of a cyclooxygenase (COX)-2 inhibitor prior authorization (PA) program on direct medical and pharmacy costs.

**Design:** Prospective, pre- and postimplementation cohort study with reference group.

**Setting:** Large corporation in the Midwest.

**Patients:** Of 26,375 continuously enrolled members, 737 used a COX-2 inhibitor in the 3 months before January 1, 2003, when the PA program was implemented.

**Measurement And Main Results:** The PA program limits coverage for a COX-2 inhibitor to members with a documented risk for a nonselective nonsteroidal antiinflammatory drug (NSAID)-induced gastrointestinal adverse event. All pharmacy and medical claims and costs were analyzed from the payer's perspective for a 15-month period. Separate pharmacy cost comparisons and medical cost comparisons were made between the 3-month quarter before PA program implementation and each follow-up quarter after PA program implementation. In the 3 months after PA program implementation, 620 (84.1%) of 737 members had no claims for a COX-2 inhibitor, and during this period their pharmacy and medical costs initially declined 40.0% (p < 0.001) and 18.7% (p < 0.001), respectively, and remained significantly lower. Among a subgroup of 156 members who tried to fill a COX-2 inhibitor prescription but were denied coverage, pharmacy and medical costs initially declined, 48.1% (p < 0.001) and 10.3% (p < 0.001), respectively, with pharmacy costs remaining significantly lower; however, overall medical expenditures increased, then returned to baseline. No change was noted in physician outpatient encounters, and two members had an emergency department visit for abdominal pain with no gastrointestinal ulcerations or bleeds during the 12-month follow-up.

**Conclusion:** Among members denied coverage for a COX-2 inhibitor after implementation of a PA program, pharmacy costs declined without a medical cost increase associated with gastrointestinal diagnoses.

Carroll, N. E., et al., “Evaluation of an automated system for prior authorization: a COX-2 inhibitor example.” American Journal Managed Care 12(9) (2006): 501 - 508.

**Objective:** To evaluate the effectiveness of an automated prior authorization (PA) system (SmartPA) in reducing use of and expenditures for cyclooxygenase-2 (COX-2) inhibitors.

**Study Design:** Before and after with control group.

**Methods:** After implementation of SmartPA in Missouri, changes in use of and expenditures for COX-2 inhibitors, COX-2 substitutes (traditional nonsteroidal anti-inflammatory drugs [NSAIDs] and other products for pain), and gastrointestinal (GI) protective agents were compared between the Medicaid program of Missouri and that of a state with no PA program for COX-2 inhibitors. Subjects were continuously enrolled for the 24-month study period and had a claim for a COX-2 inhibitor in the 12-month baseline period. Analyses included comparison of means and linear regression. Regressions controlled for age, sex, risk for GI complications, severity of illness, and the interaction between state and risk.

**Results:** Changes in expenditures for COX-2 inhibitors, NSAIDs, other pain drugs, and GI-protective drugs were $256 higher, $56 lower, $21 higher, and $198 higher, respectively, in the control state among low-risk patients. Changes in expenditures were $102 higher, $12 lower, $21 lower, and $185 higher, respectively, in the control state among high-risk patients. Results were similar for drug utilization.

**Conclusion:** Implementation of SmartPA resulted in reduced use of and expenditures for COX-2 inhibitors and reduced net expenditures for all pain and GI-protective medications. These effects were greatest for patients at low risk for GI complications.

Yokoyama, K., et al., “Effects of a step-therapy program for angiotensin receptor blockers on antihypertensive medication utilization patterns and cost of drug therapy.” Journal of Managed Care Pharmacy (13(3) (2007): 235 - 244.

**Background:** Step therapy for angiotensin receptor blockers (ARBs) requiring prior use of angiotensin-converting enzyme inhibitors (ACEIs) is a common cost-containment intervention in managed care.

**Objective:** This study was designed to assess the effectiveness of the step-therapy intervention for ARBs, including ARB/hydrochlorthiazide (HCTZ) combinations, as measured by prescription use patterns and antihypertensive drug ingredient costs.

**Methods:** Rejected and paid pharmacy claims data were evaluated from 3 health plans with a total membership of approximately 1 million. These plans had implemented a step-therapy intervention for ARBs from May 1, 2001, through February 28, 2003. Patients in the intervention group who had experienced a claim rejection for an ARB within the first 6 months of program implementation (i.e., had had no ACEI [or ACEI/HCTZ combination] or ARB [or ARB/HCTZ] claim in the preceding 3 months) were followed for 1 year after the ARB claim rejection. The rate of initiation of ARB versus ACEI and other outcomes was compared with similar data from a health plan with approximately 2 million members that did not have a step-therapy intervention for ARBs (comparison group). Mean and median total antihypertensive drug ingredient costs per patient and per day of therapy over 12 months were analyzed for the intervention and comparison groups. One pharmacy benefit manager administered the pharmacy benefits for the intervention and comparison health plans during the entire study period from May 1, 2001, through February 28, 2004, and the drug formulary was similar for all health plans.

**RESULTS:** In the step-therapy health plans, before the criterion for 15 months of continuous eligibility was applied, there were 8,904 patients (approximately 0.9% of health plan members) who either attempted and were rejected for an ARB or who newly started ACEI therapy, compared with 44,788 patients (approximately 2.2% of members in the comparison health plan) who newly started ARB or ACEI therapy without the step-therapy intervention. After the eligibility criterion was applied, there were 6,758 intervention health plan members (0.7% of members) and 33,709 comparison health plan members (1.7% of members) in the 2 study groups. In addition to the smaller proportion of total members affected by the intervention in the ARB step-therapy health plans, a smaller proportion of ARB/ACEI patients attempted to obtain an ARB (1,296/6,758 or 19.2%) compared with the health plan without step therapy (8,697/33,709 or 25.8%, P <0.001). Of the 1,296 patients who attempted to obtain an ARB and were rejected in the step-therapy group, 578 patients (44.6%) went through the prior-authorization process and received an ARB as initial therapy, 632 patients (48.8%) received other antihypertensive therapy, and 86 patients (6.6%) did not receive any antihypertensive therapy within the 12-month follow-up period. In the 12 months of follow-up, 51.1% (323/632) of patients in the intervention group who received other antihypertensives as index therapy switched to or added an ARB, and 1,234 of total ACE/ARB patients (n = 6,758, 18.3%) received ARB therapy in the health plan with step therapy compared with 10,498 of 33,709 total ACEI/ARB patients (31.1%) who received ARB therapy in the health plan without step therapy. The mean antihypertensive drug cost per patient was lower in the intervention group ($370.00) than in the comparison group ($445.12; P <0.001), and the average cost per day of antihypertensive drug therapy was 12.8% lower in the step-therapy group ($0.82) than in the comparison group ($0.94). Unadjusted annual cost savings were $75.12 per patient, and ordinary least squares regression analysis showed that the ARB step-therapy intervention was associated with $43.91 in antihypertensive drug cost savings per patient over 12 months.

**Conclusions:** Within 12 months of follow-up, a step-therapy intervention for ARBs was associated with an 18% ratio of ARB users to total ACEI/ARB users compared with a 31% ratio in a comparison health plan without the ARB step-therapy intervention. Approximately 45% of patients who did not receive an ARB as a result of the step-therapy intervention had either switched to or added an ARB within 12 months of the intervention, and almost 7% of patients did not receive any antihypertensive therapy. Antihypertensive drug cost was about 13% lower for the ACEI/ARB patients in the intervention group, creating approximately $368,000 in savings in 1 year or $0.03 per member per month across the 1 million health plan members.

Fischer, M. A., et al., “Impact of Medicaid prior authorization on angiotensin-receptor blockers: can policy promote rational prescribing?” *Health Affairs* 26(3) (May/June 2007): 800 – 807.

Prescription drug cost containment is a key health policy priority. State Medicaid programs have implemented policies requiring prior authorization before paying for angiotensin-receptor blockers (ARBs), a costly class of blood pressure medications. We examined the impact of these policies on drug use. We found that policies using a stepped-therapy approach reduced ARB use by 1.6 percent when first implemented and decreased the subsequent trend in ARB use by 1.3 percent per quarter; alternative approaches were unsuccessful. These findings have important implications for the development of rational drug reimbursement policy under Medicare Part D and other health insurance plans.

Most state programs are ineffective at controlling either use of or spending for this costly class of drugs.

Drugs are the fastest-growing component of health care costs in most developed countries, and the development of effective strategies to manage drug spending is a priority for public and private insurance programs. One common method to constrain the use of high-cost medications is prior authorization (PA), a policy requiring physicians to submit clinical information justifying use of a more expensive drug before the health insurance plan will pay for its use.

Medicaid, which provides health coverage for low-income Americans, has struggled with rising drug spending.State Medicaid programs are legally precluded from establishing closed formularies, under which some drugs are not available, but programs such as prior authorization are permitted and have been frequently used for high-cost medications.

# Polinski, J. M., et al., “Medicaid's prior authorization program and access to atypical antipsychotic medications.” Health Affairs 26(3) (May/June 2007): 750 – 760.

State Medicaid programs use prior authorization (PA) to control drug spending by requiring that specific conditions be met before allowing reimbursement. The extent to which PA policies respond to new developments concerning medication safety is not known. In April 2005 the Food and Drug Administration (FDA) issued an advisory describing increased mortality among elderly people with dementia taking atypical antipsychotics. More than a year later, no state had changed its PA policy in response. We discuss the roles of Medicaid and other insurers in responding to emerging drug safety issues and their challenges in weighing drug risks and benefits.

All insurers must struggle with payment policy and risk evaluation for complex medication classes such as the APMs. Although we only studied Medicaid, there is likely to be similar heterogeneity in other settings, and the problems for Medicare Part D plans might be especially profound. Although Medicaid policies apply to an entire state, Medicare Part D is implemented through numerous private plans in each local market. When the criteria for a given drug vary across plans, physicians must try to guess which agent is preferred for a given patient’s coverage. In this circumstance, patients are much more likely to arrive at the pharmacy and find that they have received a prescription that requires prior authorization and is overly expensive or not covered at all; receiving more expensive medications can diminish adherence, especially for vulnerable elderly patients.[29](http://content.healthaffairs.org/content/26/3/750.long#ref-29) It is not clear whether clinical problems that result from patients’ not filling prescriptions might also be a risk-management issue for insurers or providers.

# [Balkrishnan, R](http://www.ncbi.nlm.nih.gov/pubmed?term=Balkrishnan%20R%5BAuthor%5D&cauthor=true&cauthor_uid=17694729)., et al., “Prior authorization of newer insomnia medications in managed care: is it cost saving?” Journal of Clinical Sleep Medicine 3(4) (June 2007): 393 – 398.

**Study Objectives:** New pharmacotherapeutic treatment options are available to treat patients with 1 or more insomnia symptoms. However, these new pharmaceuticals are subject to a variety of managed-care tools, such as prior authorizations, that may restrict access to these medications. The objective of this study was to evaluate the economic consequences to a health plan that requires prior authorization for nonbenzodiazepine medications approved for the treatment of insomnia characterized by difficulties both falling and staying asleep.

**Methods:** An economic model was constructed to determine the effects of a typical prior-authorization program across a hypothetical managed-care population. Model parameters were derived from national estimates and a literature review.

**Results:** Economic consequences of a prior-authorization program were based on a hypothetical managed-care plan with 500,000 insured patients. An estimated acquisition cost of $300 per 100 tablets of medication requiring prior authorization, $40 to process each prior authorization request, and prior-authorization rejection rates of 2% to 5% were considered. Using the default-model inputs of the hypothetical plan characteristics and costs, the economic model estimated a loss of $600,000 to $700,000 per year to the health plan. In a 3-way threshold sensitivity analysis when prior-authorization rejection rate was increased to 5%, the cost of each request in the prior-authorization program was decreased to $20, and the cost of a first-generation nonbenzodiazepine was decreased to a generic price (i.e. $100 per prescription), the model continued to show a net loss to managed care in each case.

**Conclusions:** This model showed that requiring prior authorization for newer sleep treatments might not be a cost-saving strategy for managed-care organizations

# Law, M. R., et al., “Effect of prior authorization of second-generation antipsychotic agents on pharmacy utilization and reimbursements.” *Psychiatric Services* 59(5) (May 2008): 540 – 546.

**Objective:** Medicaid expenditures for antipsychotic medications have risen rapidly, from under $1.0 billion in 1995 to over $5.5 billion in 2005. In response, at least ten states have implemented prior-authorization programs that restrict access to particular second-generation antipsychotic agents (aripiprazole and olanzapine). Twenty-two states restrict particular dosing forms (injections). This study examined the impact of such restrictions.

**Methods:** The authors used interrupted time-series analysis of quarterly state-level drug utilization data to examine the impact of prior authorization for particular agents in West Virginia and Texas. Changes in market share of nonpreferred medications and total pharmacy costs were compared with changes in states without similar prior-authorization requirements.

**Results:** The West Virginia policy led to an immediate 3.5% reduction in market share level (p<.01) and a 1.3% decrease in trend per quarter in market share (p<.001) for nonpreferred antipsychotics, leading to a 13.9% reduction after two years. In Texas, prior authorization reduced the market share level of nonpreferred agents by 2.6% (p=.055). However, prior authorization did not lead to a significant decrease in pharmacy reimbursements in either state.

**Conclusions:** Current prior-authorization policies for second-generation antipsychotics do not appear to reduce pharmacy reimbursement, probably because alternative medications are costly. These findings suggest that any cost savings from prior-authorization policies would accrue largely through supplemental rebate agreements with manufacturers, which are likely reduced by the transfer of dually eligible Medicaid enrollees to Medicare Part D plans. Further evaluation of the clinical consequences resulting from such policies is urgently needed to determine whether the minimal cost savings outweigh the potential clinical risks.

Farley, J. F., et al., “Retrospective assessment of Medicaid step-therapy prior authorization policy for a typical antipsychotic medication.” *Clinical Therapeutics* 30(8): 1524 – 1539.

**Background:** Antipsychotic medications account for more prescription expenditures in Medicaid than any other therapeutic category. This has made them an attractive target for states hoping to curtail rising expenditures.

**Objective:** The objective of this study was to document the effects of a step-therapy prior authorization (PA) policy for atypical antipsychotic medications on: (1) Medicaid prescription expenditures among all Medicaid beneficiaries and (2) prescription and health service expenditures among patients with schizophrenia.

**Methods:** Prescription, inpatient, outpatient, and long-term care State Medicaid Research Files from Georgia and Mississippi from January 1, 1996, to December 31, 1997, were used to model an interrupted time-series analysis. We compared a step-therapy PA policy implemented in Georgia to a nonequivalent/no-treatment control group (Mississippi) over 10-month prepolicy, 11-month policy, and 3-month postpolicy periods. Segmented regression was used to estimate antipsychotic prescription expenditures among all eligible Medicaid beneficiaries. We used generalized estimating equations to model prescription and other health service expenditures with difference-indifference regressions among a cohort of patients with schizophrenia.

**Results:** Compared with Mississippi, Georgia saved ~$7 million in atypical antipsychotic expenditures over the 11-month policy period. Among patients with schizophrenia, the PA policy was associated with a $19.62 per member per month (PMPM) decrease in atypical antipsychotic expenditures and a $2.20 PMPM increase in typical antipsychotic expenditures (both, P < 0.001). Among the same patients with schizophrenia however, the reduction in atypical antipsychotic expenditures was accompanied by a $31.59 PMPM increase in expenditures for outpatient services (P < 0.001).

**Conclusion:** Although PA of atypical antipsychotics was associated with significant prescription savings to the Georgia Medicaid program, among a vulnerable cohort of patients with schizophrenia, an increase in outpatient expenditures was associated with overall savings.

# Zhang, Y., et al., “Effects of prior authorization on medication discontinuation among Medicaid beneficiaries with bipolar disorder.” *Psychiatric Services* 60(4) (April 2009): 520 – 527.

**Objective:** Few data exist on the cost and quality effects of increased use of prior-authorization policies to control psychoactive drug spending among persons with serious mental illness. This study examined the impact of a prior-authorization policy in Maine on second-generation antipsychotic and anticonvulsant utilization, discontinuations in therapy, and pharmacy costs among Medicaid beneficiaries with bipolar disorder.

**Methods:** Using Medicaid and Medicare utilization data for 2001-2004, the authors identified 5,336 patients with bipolar disorder in Maine (study state) and 1,376 in New Hampshire (comparison state). With an interrupted time-series and comparison group design, longitudinal changes were measured in second-generation antipsychotic and anticonvulsant use; survival analysis was used to examine treatment discontinuations and rates of switching medications.

**Results:** The prior-authorization policy resulted in an 8-percentage point reduction in the prevalence of use of nonpreferred second-generation antipsychotic and anticonvulsant medications (those requiring prior authorization) but did not increase use of preferred agents (no prior authorization) or rates of switching. The prior-authorization policy reduced total pharmacy reimbursements for bipolar disorder by $27 per patient during the eight-month policy period. However, the hazard rate of treatment discontinuation (all bipolar drugs) while the policy was in effect was 2.28 (95% confidence interval=1.36-4.33) higher than during the prepolicy period, with adjustment for trends in the comparison state.

**Conclusions:** The small reduction in pharmacy spending for bipolar treatment after the policy was implemented may have resulted from higher rates of medication discontinuation rather than switching. The findings indicate that the prior-authorization policy in Maine may have increased patient risk without appreciable cost savings to the state.

# Adams, A. S., et al., “Prior authorization for antidepressants in Medicaid: effects among disabled dual enrollees.” [Archives of Internal Medicine 169(8) (April 2009)](http://www.ncbi.nlm.nih.gov/pubmed/19398686): 750 - 756.

**Background:** Prior authorization is a popular, but understudied, strategy for reducing medication costs. We evaluated the impact of a controversial prior authorization policy in Michigan Medicaid on antidepressant use and health outcomes among dual Medicaid and Medicare enrollees with a Social Security Disability Insurance designation of permanent disability.

**Methods:** We linked Medicaid and Medicare (2000-2003) claims for dual enrollees in Michigan and a comparison state, Indiana. Using interrupted time-series and longitudinal data analysis, we estimated the impact of the policy on antidepressant medication use, treatment initiation, disruptions in therapy, and adverse health events among continuously enrolled (Michigan, n = 28 798; Indiana, n = 21 769) and newly treated (Michigan, n = 3671; Indiana, n = 2400) patients.

**Results:** In Michigan, the proportion of patients starting nonpreferred agents declined from 53% prepolicy to 20% postpolicy. The prior authorization policy was associated with a small sustained decrease in therapy initiation overall (9 per 10,000 population; P = .007). We also observed a short-term increase in switching among established users of nonpreferred agents overall (risk ratio, 2.88; 95% confidence interval, 1.87-4.42) and among those with depression (2.04; 1.22-3.42). However, we found no evidence of increased disruptions in treatment or adverse events (ie, hospitalization, emergency department use) among newly treated patients.

**Conclusions:** Prior authorization was associated with increased use of preferred agents with no evidence of disruptions in therapy or adverse health events among new users. However, unintended effects on treatment initiation and switching among patients already taking the drug were also observed, lending support to the state's previous decision to discontinue prior approval for antidepressants in 2003.

# Mark, T. L., et al., “The effects of antihypertensive step-therapy protocols on pharmaceutical and medical utilization and expenditures.” American Journal of Managed Care 15(2) (February 2009): 123 – 131.

**Objective:** To examine the effects of antihypertensive step therapy on prescription drug utilization and spending, and other medical care utilization and spending.

**Study Design:** Pre/post design.

**Methods:** Employers who had implemented step therapy were compared with employers who had not implemented step therapy. Data were drawn from the 2003 through 2006 MarketScan Research Databases. The study sample included employees and dependents who used antihypertensives (11,851 patients whose employer implemented a step-therapy protocol and 30,882 patients in the comparison group without step therapy). Multivariate generalized estimating equation models were used to estimate the immediate and time-varying effects of step therapy on medical and prescription drug spending and utilization, while controlling for important covariates and adjusting for clustering by patient.

**Results:** Results showed an initial 7.9% reduction in antihypertensive medication days supplied and an initial 3.1% reduction in medication costs among antihypertensive users in the step-therapy plans. However, these percentages grew in each subsequent quarter. Antihypertensive users in step-therapy programs also experienced an increase in inpatient admissions and emergency room visits. After an initial decline in spending, the step-therapy group incurred $99 more per user in quarterly expenditures than the comparison group.

**Conclusions:** The intended effect of step therapy is to substitute cheaper and equivalently effective medications for more expensive medications. As this study demonstrates, step therapy may create barriers to receiving any medication, resulting in higher medical utilization and costs. Further research is needed to understand why these unintended consequences occur and how they might be avoided.

# Simeone, J. C., et al., “Cost and utilization of behavioral health medications associated with rescission of an exemption for prior authorization for severe and persistent mental illness in the Vermont Medicaid Program.” Journal of Managed Care Pharmacy 16(5) (June 2010): 317 – 328.

**Background:** In recent years, many state Medicaid programs have implemented preferred drug lists (PDL) to control pharmaceutical costs by generating supplemental rebate revenues and directing providers to the most cost-effective treatments. Two states, Michigan and Vermont, sought approval from the Centers for Medicare and Medicaid Services for supplemental rebates for their Medicaid fee-for-service programs in 2002. Behavioral health medications were largely excluded from PDLs and other managed care initiatives implemented by state Medicaid programs because of significant opposition to any impact on this "vulnerable" population. In November 2001, the Vermont Medicaid program implemented the Vermont Health Access Pharmacy Benefit Management Program, a PDL designed to promote cost-effective use of medications. Despite the potential cost savings resulting from implementation of a PDL, behavioral health providers and advocates in the state of Vermont opposed the implementation of the managed care initiative for beneficiaries with severe mental illness, and after January of 2002, Vermont's program was changed to exempt beneficiaries meeting the "severe and persistent mental illness" (SPMI) criteria from prior authorization (PA) for behavioral health medications not on the Medicaid PDL. The SPMI exemption was phased out by June 30, 2006.

**Objectives:** To determine the effects of the rescission of the PA exemption on utilization and costs of 3 classes of behavioral health medications (antidepressants, antipsychotics, and anxiolytics/sedatives). Secondary analyses were conducted to assess the association between rescission of the PA exemption and 2 quality measures that might be associated with pharmacy management policy: (a) behavioral health hospitalizations and (b) high-dose prescribing of antipsychotics, defined as dosing that exceeded the manufacturer-recommended maximum dose by 25%.

**Methods:** This was a retrospective analysis of pharmacy claims for beneficiaries of the Office of Vermont Health Access Medicaid Program for dates of service from July 1, 2005, through December 31, 2007. The 12-month PA exemption period for 3 categories of drugs (antidepressants, antipsychotics, and anxiolytics/sedatives) was July 1, 2005, through June 30, 2006; and the post-PA exemption period was the 12 months from January 1, 2007, through December 31, 2007, following rescission of the SPMI exemption. Costs in this analysis were defined as the amount paid by Medicaid, excluding federal drug rebates paid by drug manufacturers and supplemental rebates associated with the PDL program. Costs were adjusted for inflation using the Consumer Price Index for medical costs. Frequencies were used to identify trends between medication classes and time periods. Medical claims from the 2 time periods were used to assess inpatient hospitalization trends. Descriptive statistics, Pearson chi-square tests (for categorical data), and t-tests (for continuous data) were used to assess the 2 study cohorts.

**Results:** 17.8% (n=22,130) of 124,169 eligible beneficiaries in the PA exemption period had 1 or more pharmacy claims in the 3 classes of RESEARCH medications exempt from PA versus 19.2% (n=23,717) of 123,499 eligible beneficiaries in the post-PA exemption period. Utilization of behavioral medications per member per month (PMPM) increased by 14.3% from 0.14 claims PMPM in the PA exemption period to 0.16 claims PMPM in the post-PA exemption period, similar to the 14.1% increase in the utilization of nonbehavioral medications (from 0.64 to 0.73 claims PMPM). Utilization changed little between the PA exemption period and the post-PA exemption period for the 3 individual classes of behavioral health drugs, 0.08 claims PMPM versus 0.09 claims PMPM for antidepressants and 0.03 for both study periods for both antipsychotics and anxiolytics/sedative hypnotics. PMPM costs for the 3 drug classes exempt from PA increased by 2.1% from $12.76 to $13.03, compared with a 12.2% increase from $42.58 PMPM to $47.79 PMPM for nonbehavioral health medications. The small 2.1% increase in PMPM costs for the 3 formerly PA-exempt drug classes was attributable in part to a 12.9% reduction in average cost per pharmacy claim, from $94.05 to $81.92, including a 24.8% reduction in the average cost per antidepressant claim, from $65.59 to $49.33. For the subgroup of beneficiaries taking atypical antipsychotic medications, the percentage with high-dose prescriptions decreased from 3.1% to 2.2%. Mental health inpatient hospitalizations also decreased from 0.6% of beneficiaries in the PA exemption period to 0.4% in the post-PA exemption period.

**Conclusions:** In a Medicaid population excluding Medicare dual-eligible beneficiaries, the rescission of a PA exemption for 3 major classes of behavioral health medications in a PDL was not associated with decreased utilization of formerly PA-exempt behavioral health medications. The increase in PMPM spending for the formerly PA-exempt behavioral health medications was small compared with the increase in PMPM cost for nonbehavioral health medications, and there were fewer beneficiaries with hospitalization for mental health reasons in the period after rescission of the PA exemption.

# [Balkrishnan, R](http://www.ncbi.nlm.nih.gov/pubmed?term=Balkrishnan%20R%5BAuthor%5D&cauthor=true&cauthor_uid=19821787)., et al., “Prior authorization for topical psoriasis treatments: is it cost-beneficial for managed care?” *Journal of Dermatological Treatment* 21(3) (May 2010): 178 – 184.

**Objective:** The introduction of novel therapeutic options for psoriasis has raised managed care's interest in controlling costs associated with dermatological treatments. Prior authorization (PA) can be a successful way of managing costs. However, experience with topical treatments for acne suggests that PA may not be cost-effective. The role of managed care in dermatology and the potential impact of PA requirements for novel topical therapies for psoriasis are considered.

**Methods:** Using a model based on recent survey data, total annual cost estimates for a managed care organization to cover psoriasis treatment with a topical agent with or without PA requirements were calculated and compared. Costs for treatment and administrative costs associated with PA processes were included. The model assumed 68 000 insured patients required treatment (with an additional 1% to account for abuse/misuse), an average wholesale price of $100 per prescription (each prescription filled 4x/year), and a cost of $20 to process each PA request.

**Results:** The total annual costs were $28 573 600 when PA was required and $27 472 000 when PA was not required. Thus, there was a total annual loss to the managed care organization of $1 101 600 associated with PA requirements.

**Conclusions:** Requiring PA for novel topical treatments for psoriasis, such as the new two-compound product containing calcipotriene and betamethasone dipropionate (Taclonex((R)); Warner Chilcott (US), Inc.; marketed as Daivobet((R))/Dovobet((R)) outside US by LEO Pharma), is not likely to be cost-effective for a managed care organization.

# Blachar, A., et al., “Preauthorization of CT and MRI examinations: assessment of a managed care preauthorization program based on the ACR Appropriateness Criteria and the Royal College of Radiology guidelines.” *Journal of the American College of Radiology* 3(11) (November 2006): 851 – 859.

**Purpose:** To evaluate computed tomography (CT) and magnetic resonance imaging (MRI) utilization patterns before and after the implementation of a preauthorization program based on the ACR Appropriateness Criteria((R)) and the guidelines of the Royal College of Radiologists.

**Materials And Methods:** All CT and MRI requests received at the preauthorization center and CT and MRI examinations actually performed were identified by our health care service's centralized computerized database between January 1, 2000, and December 31, 2003. The obligatory preauthorization of CT and MRI requests was established for CT in September 2001 and for MRI in February 2002. All ambulatory CT and MRI examination requests sent for approval during the study period by most of our health care physicians were included in the study. The preauthorization program model is presented, and multiple parameters were evaluated from January 2000 to December 2003, before and after preauthorization was established.

**Results:** Before preauthorization was required, the CT and MRI utilization rates were constantly increasing by 20% and 5% per year for CT and MRI, respectively. After preauthorization was implemented, CT and MRI annual performance rates decreased from 25.9 and 7 examinations per 1,000, respectively, in 2000 to 17.3 and 5.6 examinations per 1,000, respectively, in 2003. The decreases in the utilization of MRI and CT imaging between 2001 and 2003 were 9% (12,129 compared with 11,070 MRI examinations) and 33% (81,223 compared with 57,204 CT examinations), respectively, resulting in substantial, statistically significant cost savings. The deferral rate ranged from 7.5% to 12.2% (mean = 9.8%) for CT and 13.9% to 21.4% (mean = 17%) for MRI. Deferred cases in CT were most commonly in neuroradiology, musculoskeletal radiology, and CT angiography (ranges of deferred cases 9% to 12%, 11% to 12%, and 10% to 12%, respectively). Deferred cases in MRI were most commonly in abdominal and chest radiology (ranges of deferred cases 32% to 37% and 20% to 31%, respectively). Computed tomography was more commonly utilized inappropriately by pediatric professions, and MRI was more commonly utilized inappropriately by medical subspecialty professions.

**Conclusion:** Preauthorization of CT and MRI requests results in a substantial decrease in utilization of these modalities with reduction in imaging costs.

# Lu, C., et al., “Unintended impacts of a Medicaid prior authorization policy on access to medications for bipolar illness.” *Medical Care* 48(1) (January 2010): 4 – 9.

**Objectives:** Prior authorization policies (PA) are widely used to control psychotropic medication costs by state Medicaid programs and Medicare Part D plans. The objective of this study was to examine the impact of a Maine Medicaid PA policy on initiation and switching of anticonvulsant and atypical antipsychotic treatments among patients with bipolar disorder.

**Methods:** We obtained Maine and New Hampshire (comparison state) Medicaid and Medicare claims data for 2001 to 2004; the Maine PA policy was implemented in July 2003. Among continuously enrolled patients with bipolar disorder (Maine: n = 5336; New Hampshire: n = 1376), we used an interrupted times series with comparison group design to estimate changes in rates of initiating new episodes of bipolar treatment and generalized estimating equations models to examine rates of switching therapies among patients under treatment.

**Results:** The Maine PA policy was associated with a marked decrease in rates of initiation of bipolar treatments; a relative reduction of 32.3% (95% CI: 24.8, 39.9) compared with expected rates at 4 months after policy implementation. This decrease was driven primarily by reductions in the initiation of nonpreferred agents. The policy had no discernable impact on rates of switching therapy among patients currently on treatment (RR: 1.03; 95% CI: 0.76, 1.39).

**Conclusions:** The findings of this study provide evidence that PA implementation can be a barrier to initiation of nonpreferred agents without offsetting increases in initiation of preferred agents, which is a major concern. There is a critical need to evaluate the possible unintended effects of PA policies to achieve optimal health outcomes among low-income patients with chronic mental illness. In addition, more research is needed to understand how these barriers arise and whether specific seriously mentally ill populations or drug classes should be exempted from PA policies.

Mahoney J. J. “Reducing patient drug acquisition costs can lower diabetes health claims.” *American Journal of Managed Care* 11(5 supplement) (August 2005): S170 – S176.

Concerned about rising prevalence and costs of diabetes among its employees, Pitney Bowes Inc recently revamped its drug benefit design to synergize with ongoing efforts in its disease management and patient education programs. Specifically, based on a predictive model showing that low medication adherence was linked to subsequent increases in healthcare costs in patients with diabetes, the company shifted all diabetes drugs and devices from tier 2 or 3 formulary status to tier 1. The rationale was that reducing patient out-of-pocket costs would eliminate financial barriers to preventive care, and thereby increase adherence, reduce costly complications, and slow the overall rate of rising healthcare costs. This single change in pharmaceutical benefit design immediately made critical brand-name drugs available to most Pitney Bowes employees and their covered dependents for 10% coinsurance, the same coinsurance level as for generic drugs, versus the previous cost share of 25% to 50%. After 2 to 3 years, preliminary results in plan participants with diabetes indicate that medication possession rates have increased significantly, use of fixed-combination drugs has increased (possibly related to easier adherence), average total pharmacy costs have decreased by 7%, and emergency department visits have decreased by 26%. Hospital admission rates, although increasing slightly, remain below the demographically adjusted Medstat benchmark. Overall direct healthcare costs per plan participant with diabetes decreased by 6%. In addition, the rate of increase in overall per-plan-participant health costs at Pitney Bowes has slowed markedly, with net per-plan-participant costs in 2003 at about 4000 dollars per year versus 6500 dollars for the industry benchmark. This recent moderation in overall corporate health costs may be related to these strategic changes in drug benefit design for diabetes, asthma, and hypertension and also to ongoing enhancements in the company's disease management and wellness programs.

# Robinson, J. C. “Insurers’ Strategies For Managing The Use And Cost Of Biopharmaceuticals” *Health Affairs* 25(5) (September 2006): 1205 – 1217.

This paper examines strategies under development by health insurers to manage biopharmaceuticals, as their use spreads beyond rare diseases and academic sub-specialists to common conditions and community-based practices. Emphasis is placed on medical management (formulary placement and prior authorization), network design (physician contracting and drug distribution), and benefit design (coinsurance and annual payment limits). Contemporary initiatives are modest in ambition but potentially lay the foundation for a framework that balances access to innovation with affordability in this dynamic industry.

Because no U.S. central government is making decisions about high-cost biologics, insurers are leading the way in forming social policy.

# Brown, C. M., et al., “Effects of a psychotherapeutic drug prior authorization (PA) requirement on patients and providers: a providers' perspective.” *Administration and Policy in Mental Health* 35(3) (May 2008): 181 – 188.

This study describes the effects of a Texas Medicaid PA requirement for psychotherapeutic medications from the perspective of mental health care providers. Three focus groups were conducted and a content analysis was performed on the generated transcripts. Providers identified five categories of issues that are relevant to the PA process: (1) system/administrative factors; (2) costs/ outcomes; (3) prescribing issues; (4) evaluation criteria; and (5) patient-provider relationship and patient visit. Administrative burden and unintended patient outcomes were the most frequently reported issues related to PA. However, all five issues represent important factors that providers deal with when caring for patients with mental illness.

# Morden, N. E., et al., “Medicaid prior authorization and controlled-release oxycodone.” *Medical Care* 46(6) (June 2008): 573 – 580.

**Background:** Since its introduction in 1996, controlled-release (CR) oxycodone use has increased steadily despite its high cost. To control use and expenditures, many Medicaid programs have implemented CR oxycodone prior authorization (PA) policies. Few studies evaluate Medicaid policies or compare lenient and strict policies in multiple states.

**Objective:** To estimate the impact of PA on CR oxycodone use by Medicaid beneficiaries.

**Design:** Secondary data analysis of 50 states' aggregate Medicaid prescription dispensing records,1996-2005. PA details were systematically collected. Regression and random effects meta-analyses estimated impact of strict and lenient PA policies on CR oxycodone use and expenditures.

**Measures:** Change in rate of CR oxycodone use, proportion of long-acting opiates accounted for by CR oxycodone and average long-acting opiate dose expenditure.

**Results:** In 2004, CR oxycodone accounted for 12.4% of all opiates and 32.2% of long-acting opiates dispensed to Medicaid beneficiaries. Over the study period its use increased, on average, 109% annually, and 21 states implemented PA. PA was associated with state-specific use changes ranging from -76% to 9%. In aggregate, PA was associated with a nonsignificant decrease in CR oxycodone use, a significant 8% decrease in CR oxycodone as a proportion of long-acting opiate doses, and a small but significant change of -$0.31 in average cost per long-acting opiate dose. Strict policies were associated with greater changes.

**Conclusions:** PA impact varied by state and was less dramatic than previously described Medicaid PA effects, suggesting CR oxycodone is relatively refractory to PA. A refined measure of such policies is needed to identify effective prescription management strategies.

# Kahan, N. R., et al., “Modifying prescribing behaviour of angiotensin receptor blockers by selectively rescinding managerial prior authorization requirements for losartan.” *British Journal of Clinical Pharmacology* 72(6) (December 2011): 997 – 1001.

**Aims:** To evaluate whether rescinding the prior authorization (PA) requirement (managerial pre-approval) for losartan in an health maintenance organization (HMO) could reduce prescribing of the more expensive angiotensin receptor blockers (ARBs).

**Methods:** HMO physicians were notified that losartan would no longer require PA, and appropriate changes were made to the electronic prescribing computer program. The monthly distribution by drug of the number of prescriptions for ARBs dispensed for new patients was calculated before and after the policy change from data captured from electronic records. The proportion of patients (percentage and 95% confidence interval) treated with losartan who met the criteria for treatment with ARBs (hypertension or cardiac insufficiency in patients who have developed adverse effects in response to angiotensin-converting enzyme inhibitors or macroproteinuria) during the first month after the PA requirement was rescinded was calculated.

**Results:** The total number of PA requests for ARBs declined by 48.6% from 961 in December 2008, the month before the policy change, to 494 the following January, rising again to 651 during January 2010. Prescription incidence changed from 121 to 255 patients treated per month (114% increase) for losartan, from 15 to 16 (6.7% increase) for candesartan, and from 89 to 71 (20.2% decrease) for valsartan. The duration of effect for decrease in ARB requests for the more expensive drugs was approximately 1 year. Only 23.3% (95% confidence interval 18.1-28.4) of patients receiving losartan met the criteria for receiving ARBs.

**Conclusions:** Rescinding the PA requirement for this drug alone was an effective limited-duration strategy for reduction of prescription of relatively expensive drugs.

# Margolis, J. M., et al., “Effects of a Medicaid prior authorization policy for pregabalin.” *American Journal of Managed Care* 15(10) (October 2009): 95 – 102.

**Objective:** To explore the effect of a prior authorization (PA) policy restricting access to pregabalin for the management of diabetic peripheral neuropathy (DPN) or postherpetic neuralgia (PHN) on the overall utilization of pharmacologic therapy and healthcare services among fee-for-service Medicaid plan beneficiaries.

**Study Design:** Retrospective claims data were obtained for 2005 and 2006 from 6 state Medicaid programs. Two states that had implemented pregabalin PAs beginning in 2006 were compared in terms of drug utilization and costs with 4 states having no such restrictions.

**Methods:** Patients at least 18 years old in a Medicaid fee-for-service program having a diagnosis of DPN or PHN and at least 1 claim for DPN- or PHN-specific pain medication were selected. Pharmacologic therapy, healthcare utilization, and expenditures were analyzed using bivariate statistics and generalized linear models in a difference-in-difference approach for comparing outcomes between cohorts year over year.

**Results:** The 2 cohorts included 424 patients in the restricted states and 5153 patients in the unrestricted states. Compared with the use in the unrestricted states, the probability of pregabalin use in the restricted states decreased by 4.0 percentage points (P = .02) from 2005 to 2006, while the probability of opioid use increased by 6.5 percentage points (P <.01).The DPN- or PHN-related total healthcare costs were $418 higher for the restricted states versus the unrestricted states (P <.001).

**Conclusion:** Although the PA was shown to effectively control access to pregabalin, the overall effect was an increase in the use of opioids and alternative pain management therapies associated with increased disease-related healthcare costs.

# Buckley, B. C., et al., “Description of the outcomes of prior authorization of palivizumab for prevention of respiratory syncytial virus infection in a managed care organization.” *Journal of Managed Care Pharmacy* 16(1) (January/February 2010): 15 – 22.

**Background:** Respiratory syncytial virus (RSV) is the leading cause of upper and lower respiratory tract infections in infants and young children. Most children are exposed to the virus before they are 2 years old and experience such symptoms as cough, fever, and irritability. In a select population of infants, the virus can cause hypoxemia and hospitalization. To avoid hospitalization, good infection control practices should be employed, and for those infants at high risk, prophylaxis with palivizumab is indicated. Palivizumab has been shown to reduce hospitalization rates in high-risk infants by 50%. Because of the high cost of palivizumab, it is prudent to use this medication in the population in which it will be most effective. The American Academy of Pediatrics (AAP) established the criteria for those infants who would benefit the most from palivizumab prophylaxis, and these criteria were the foundation for a prior authorization (PA) program to determine coverage of palivizumab in a health plan of approximately 500,000 members.

**Objective:** To (a) analyze the appropriateness of this PA program for palivizumab used prophylactically for RSV, and (b) determine the financial cost associated with the medication and disease for this health plan.

**Methods:** A 3-year, retrospective study was conducted from the 2005- 2006 RSV season through the 2007-2008 season. The primary endpoint outcome was the hospitalization rate associated with RSV infection. Secondary endpoints included the cost of palivizumab and RSV-related emergency room (ER) utilization. Infants were placed into 2 groups: those who received PA approval for use of palivizumab and those who were denied coverage in the PA process. Disease-related hospitalization and ER visits were identified by at least 1 administrative claim containing either a primary or secondary ICD-9-CM code for any of the following: RSV (079.6), acute bronchiolitis caused by RSV (466.11), or pneumonia caused by RSV (480.1). Drug cost was defined as the health plan's allowed amount, which is based on a predefined fee schedule for the Current Procedural Terminology (CPT) code 90378 for palivizumab. Hospital and ER costs are the health plan allowed amounts (health plan plus member cost) based on the reimbursement rates determined by diagnosis related group (DRG) and other coding, and the plan-allowed amount based on DRGs includes all services and drugs provided in the specific encounter. Drug cost avoided was calculated as the average cost of palivizumab treatment per episode multiplied by the number of infants denied coverage of palivizumab over the 3-year study period.

**Results:** Over 3 RSV seasons through May 2008, the PA program received 1,090 requests for coverage of palivizumab, of which 348 (31.9%) were denied. Of 742 PA-approved infants, 629 received at least 1 dose of palivizumab. The mean (SD) gestational age of the PA-denied group was 34.4 (2.5) weeks versus 32.5 (4.0) weeks for the PA-approved group (P < 0.001). In the PA-denied group, 14 infants (4.0%) were subsequently hospitalized with an RSV infection, and 5 (1.4%) had an RSV-related ER visit versus 40 (6.4%) hospitalized and 14 (2.2%) with ER visits for infants in the PA-approved group (P = 0.055 and P = 0.019, respectively); 15 (4.3%) of the PA-denied group had either a hospitalization or an ER visit versus 42 (6.6%) in the PA-approved group (P = 0.060). One patient in the palivizumab PA-approved group died. Over the 3 RSV seasons, the mean number of palivizumab doses and mean allowed palivizumab cost per treatment episode (per infant per season) were 3.64 and $6,950, respectively, and the average allowed palivizumab cost was $7,702 per utilizing infant. Total per infant costs for palivizumab, RSV hospitalizations, and RSV-related ER visits were $8,534 for infants receiving palivizumab compared with $223 for those denied palivizumab coverage (P = 0.002). Drug cost avoidance associated with the PA program was estimated to be $2,418,600 (348 infants times $6,950 palivizumab cost per episode) over the 3 RSV seasons.

**Conclusion:** In a 500,000-member health plan, a PA program to restrict palivizumab use in accordance with AAP recommendations was associated with estimated palivizumab drug cost avoidance of more than $2.4 million over 3 years. There was no significant difference in the RSV-related hospitalization rate for the PA-denied versus the PA-approved groups, but the PA-denied group had a slightly lower rate of RSV-related ER visits.

# Feinberg, B. A., et al., “Implementation of cancer clinical care pathways: s successful model of collaboration between payers and providers.” American Journal of Managed Care 18(5) (May 2012): 194 – 199.

Despite rising medical costs within the US healthcare system, quality and outcomes are not improving. Without significant policy reform, the cost-quality imbalance will reach unsustainable proportions in the foreseeable future. The rising cost of healthcare in part results from an expanding aging population with an increasing number of life-threatening diseases. This is further compounded by a growing arsenal of high-cost therapies. In no medical specialty is this more apparent than in the area of oncology. Numerous attempts to reduce costs have been attempted, often with limited benefit and brief duration. Because physicians directly or indirectly control or influence the majority of medical care costs, physician behavioral changes must occur to bend the healthcare cost curve in a sustainable fashion. Experts within academia, health policy, and business agree that a significant paradigm change in stakeholder collaboration will be necessary to accomplish behavioral change. Such a collaboration has been pioneered by Blue Cross Blue Shield of Michigan and Physician Resource Management, a highly specialized oncology healthcare consulting firm with developmental and ongoing technical, analytic, and consultative support from Cardinal Health Specialty Solutions, a division of Cardinal Health. We describe a successful statewide collaboration between payers and providers to create a cancer clinical care pathways program. We show that aligned stakeholder incentives can drive high levels of provider participation and compliance in the pathways that lead to physician behavioral changes. In addition, claims-based data can be collected, analyzed, and used to create and maintain such a program.

# Wegner, S. E., et al., “A physician-friendly alternative to prior authorization for prescription drugs.” American Journal of Managed Care 15(12) (December 2009): 115 – 122.

**Objective:** To determine if the instant approval (IA) process differs from the traditional prior authorization (PA) process in preferred drug channeling, resultant gaps in therapy, and provider dissatisfaction.

**Study Design:** An interrupted time series analysis using pharmacy claims and a retrospective cohort study.

**Methods:** The study assessed changes in preferred drug use and subsequent cost reductions. A retrospective cohort study determined if the IA process produced fewer gaps in therapy than the PA process. Provider acceptance of the IA process was assessed using a brief survey of 240 randomly selected primary care practices.

**Results:** Market share for preferred proton pump inhibitors quadrupled from a range of 17.6% to 19.3% at baseline to 76% in the first month after implementation of the new IA policy. Most practices (81.1%) reported reduced administrative burden with the IA process. The median gaps between medication fills for patients using IA were approximately one-half those of patients using PA (P <.001) and were one-fourth in a subset of highly adherent, regularly filling patients (P <.001).

**Conclusions:** Instant approval may be more patient friendly and prescriber friendly than PA as assessed by a proxy measure for access (gap in therapy) and physician-reported acceptance. Despite its ease of use, IA does not seem to reduce switching to preferred drugs.

Lichtenberg, F. R. “The effect of access restrictions on the vintage of drugs used by Medicaid enrollees.” *American Journal Managed Care* 11 (January 2005): sp7 – sp13.

**Objective:** To examine the extent to which recent Medicaid drug access restrictions, such as preferred drug lists (PDLs), may affect the vintage (or time since Food and Drug Administration approval) of 6 types of drugs used by Medicaid beneficiaries.

**Study Design:** Retrospective claims database analysis using National Drug Code pharmacy claims data.

**Methods:** A regression model was developed to analyze the effect that Medicaid access restrictions had on the vintage of medications prescribed in 6 different therapeutic categories. A "difference in differences" approach was used to compare the change in vintage of medications prescribed in Medicaid versus non-Medicaid patients between the January-June 2001 and July-December 2003 study periods.

**Results:** The results of the regression model showed that PDLs increased the age of Medicaid prescriptions by less than 1 year for drugs in 5 of the 6 therapeutic classes analyzed. In the case of pain management medications, the increase was more than 1.2 years.

**Conclusions:** The results of the regression model suggest that Medicaid drug access restriction programs (e.g., PDLs) have resulted in an increase in the age of drugs prescribed for Medicaid beneficiaries versus non-Medicaid patients. Since previous research has suggested a clinical and economic advantage to utilizing newer versus older drugs, further research should be conducted to explore how these medication restriction policies may unduly affect Medicaid beneficiaries compared with privately insured patients.

# Roughead, E. E., et al., “Differential effect of early or late implementation of prior authorization policies on the use of Cox II inhibitors.” Medical Care 44(4) (April 2006): 378 – 382.

**Background:** State Medicaid programs introduce many types of prescribing restrictions to manage pharmaceutical use and expenditure. Little is known about the differential effect of implementing prior authorization (PA) policies at market entry versus waiting until several years later when prescribing behavior may already be established.

**Objectives:** We sought to examine the impact on overall use of Cox II inhibitors of PA policies implemented at market entry versus at least 2 years after market entry.

**Research Design:** We quantified Cox II inhibitor and nonselective nonsteroidal anti-inflammatory drug (NSAID) utilization for state Medicaid programs from January 1996 to September 2003. We used generalized estimating equations, Tukey's studentized range test and segmented linear regression on state Medicaid programs to determine the significance of changes in medication use.

**Measures:** The primary end point was the number of defined daily doses (DDD) per 1000 population per day.

**Results:** Six states implementing prescribing restrictions for Cox II inhibitors at market entry had the lowest rates of uptake, averaging 10.9 DDD/1000/d. Twelve states adopting restrictions more than 2 years after market entry experienced declines in use from 23.0 DDD/1000/d before to 13.9 DDD/1000/d after the restrictions (P < 0.01). The 17 states that had never restricted access had the highest utilization, averaging 29.0 DDD/1000/d.

**Conclusion:** Implementing prescribing restrictions at market entry of Cox II inhibitors was effective in restricting uptake. Despite the difficulty in changing well-established prescribing patterns, utilization in states implementing policies 2 years after market entry approached that of the early adopting states within 1 year. Clinical outcomes of such policies remain unknown.

Huskamp, H. A., et al., “Economic Grand Rounds: Coverage and Prior Authorization of Psychotropic Drugs Under Medicare Part D” *Psychiatric Services* 58(3) (2007): 308-310.

**Conclusion:** The special protections afforded to antidepressant, antipsychotic, and anticonvulsant medications under the Part D benefit will help to ensure that Medicare beneficiaries with a mental illness have access to needed medications. However, despite these protections, certain product formulations may not be covered and prior authorization may be used by a minority of plans. Although dually eligible beneficiaries are permitted to change plans at any time (unlike beneficiaries without dual eligibility, who may switch plans only once a year), dual eligibles with a mental illness may have greater difficulty assessing plan options and switching plans than beneficiaries without a mental illness. The effect on beneficiaries will depend on the restrictiveness of both the prior authorization and appeals processes, which is unknown at this point. Importantly, plans' formulary coverage and use of management tools, such as prior authorization, are likely to change over time as experience with the program increases. Ongoing monitoring of these issues is important to ensure that beneficiaries have access to needed medications.

**Concurrent Review**

**Case Management**

Roze, G. T., et al., “Cost-Effectiveness of Diabetes Case Management for Low-Income Populations” *Health Services Research* 42(5) (October 2007); 1943 – 1959.

**Objective:** To evaluate the cost-effectiveness of Project Dulce, a culturally specific diabetes case management and self-management training program, in four cohorts defined by insurance status.

**Data Sources/Study Setting:** Clinical and cost data on 3,893 persons with diabetes participating in Project Dulce were used as inputs into a diabetes simulation model.

**Study Design:**  The Center for Outcomes Research Diabetes Model, a published, peer-reviewed and validated simulation model of diabetes, was used to evaluate life expectancy, quality-adjusted life expectancy (QALY), cumulative incidence of complications and direct medical costs over patient lifetimes (40-year time horizon) from a third-party payer perspective. Cohort characteristics, treatment effects, and case management costs were derived using a difference in difference design comparing data from the Project Dulce program to a cohort of historical controls. Long-term costs were derived from published U.S. sources. Costs and clinical benefits were discounted at 3.0 percent per annum. Sensitivity analyses were performed.

**Principal Findings:** Incremental cost-effectiveness ratios of $10,141, $24,584, $44,941, and $69,587 per QALY gained were estimated for Project Dulce participants versus control in the uninsured, County Medical Services, Medi-Cal, and commercial insurance cohorts, respectively.

**Conclusions:** The Project Dulce diabetes case management program was associated with cost-effective improvements in quality-adjusted life expectancy and decreased incidence of diabetes-related complications over patient lifetimes. Diabetes case management may be particularly cost effective for low-income populations.

Riegel, B., et al., “Randomized Controlled Trial of Telephone Case Management in Hispanics of Mexican Origin With Heart Failure” *Journal of Cardiac Failure* 12(3): 211- 219

**Background:** Disease management is effective in the general population, but it has not been tested prospectively in a sample of solely Hispanics with heart failure (HF). We tested the effectiveness of telephone case management in decreasing hospitalizations and improving health-related quality of life (HRQL) and depression in Hispanics of Mexican origin with HF.

**Methods and Results:** Hospitalized Hispanics with chronic HF (n = 134) were enrolled and randomized to intervention (n = 69) or usual care (n = 65). The sample was elderly (72 ± 11 years), New York Heart Association class III/IV (81.3%), and poorly educated (78.4% less than high school education). Most (55%) were unacculturated into US society. Bilingual/bicultural Mexican-American registered nurses provided 6 months of standardized telephone case management. Data on hospitalizations were collected from automated systems at 1, 3, and 6 months after the index hospital discharge. Health-related quality of life and depression were measured by self-report at enrollment, 3, and 6 months. Intention to treat analysis was used. No significant group differences were found in HF hospitalizations, the primary outcome variable (usual care: 0.49 ± 0.81 [CI 0.25–0.73]; intervention: 0.55 ± 1.1 [CI 0.32–0.78] at 6 months). No significant group differences were found in HF readmission rate, HF days in the hospital, HF cost of care, all-cause hospitalizations or cost, mortality, HRQL, or depression.

**Conclusion:** These results have important implications because of the current widespread enthusiasm for disease management. Although disease management is effective in the mainstream HF patient population, in Hispanics this ill, elderly, and poorly educated, a different approach may be needed.

Metsch, G. L., et al., “Efficacy of a brief case management intervention to link recently diagnosed HIV-infected persons to care” *AIDS* 19(4) (March 2005); 423 – 431.

**Objective**: The Antiretroviral Treatment Access Study (ARTAS) assessed a case management intervention to improve linkage to care for persons recently receiving an HIV diagnosis.

**Methods**: Participants were recently diagnosed HIV-infected persons in Atlanta, Baltimore, Los Angeles and Miami. They were randomized to either standard of care (SOC) passive referral or case management (CM) for linkage to nearby HIV clinics. The SOC arm received information about HIV and local care resources; the CM intervention arm included up to five contacts with a case manager over a 90-day period. The outcome measure was self-reported attendance at an HIV care clinic at least twice over a 12-month period.

**Results**: A higher proportion of the 136 case-managed participants than the 137 SOC participants visited an HIV clinician at least once within 6 months [78 versus 60%; adjusted relative risk (RRadj), 1.36; P = 0.0005) and at least twice within 12 months (64 versus 49%; RRadj, 1.41; P = 0.006). Individuals older than 40 years, Hispanic participants, individuals enrolled within 6 months of an HIV-seropositive test result and participants without recent crack cocaine use were all significantly more likely to have made two visits to an HIV care provider. We estimate the cost of such case management to be US $600-1200 per client.

**Conclusion**: A brief intervention by a case manager was associated with a significantly higher rate of successful linkage to HIV care. Brief case management is an affordable and effective resource that can be offered to HIV-infected clients soon after their HIV diagnosis.

Miller, P. V., et al., “Multidisciplinary Team Approach in the Management of Tracheostomy Patients” *Otolaryngology – Head & Neck Surgery* 147(4) (October2012): 684 – 691

**OBJECTIVE:** To examine whether the implementation of a multidisciplinary percutaneous tracheostomy team decreases complications, improves efficiency in patient care, and reduces length of stay and cost in patients undergoing percutaneous tracheostomy.

**STUDY DESIGN:** Case series with planned data collection.

**SETTING:** Urban, academic, tertiary care medical center.

**SUBJECTS AND METHODS:** Patients who underwent a percutaneous tracheostomy in 2004 and 2008, before and after the formation of a multidisciplinary percutaneous tracheostomy team, were included in the study. Data for the study were retrieved from a tracheostomy database. Measured outcomes include complications, efficiency, length of stay, and cost.

**RESULTS:** Complications such as airway bleeding and physiological disturbances decreased significantly in 2008 as compared with 2004. The percentage of patients who received a tracheostomy within 2 days increased from 42.3% to 92% (2004 vs 2008), showing improvement in efficiency of care. There was no significant difference between the groups in terms of infection rate, length of stay, or mortality. However, in a subanalysis, the length of stay was found to be decreased in patients whose primary diagnosis was a neurological disorder. Finally, despite the necessity of a hospital-based subsidy, the team approach yielded substantial financial benefit to the medical center.

**CONCLUSIONS:** Airway bleeding, physiological disturbances, and efficiency of care improved after the institution of a multidisciplinary percutaneous tracheostomy team approach and may have a favorable impact on health care costs.

Schechter, C. B., et al., “Intervention Costs and Cost-Effectiveness of a Successful Telephonic Intervention to Promote Diabetes Control” *Diabetes Care* 35(11) (November 2012): 2156 – 2160.

**OBJECTIVE:** To characterize the costs and cost-effectiveness of a telephonic behavioral intervention to promote glycemic control in the Improving Diabetes Outcomes study.

**RESEARCH DESIGN AND METHODS:** Using the provider perspective and a time horizon to the end of the 1-year intervention, we calculate the costs of a telephonic intervention by health educators compared with an active control (print) intervention to improve glycemic control in adults with type 2 diabetes. We calculate the cost-effectiveness ratios for a reduction of one percentage point in hemoglobin A(1c) (A1C), as well as for one participant to achieve an A1C <7%. Base-case and sensitivity analysis results are presented.

**RESULTS:** The intervention cost $176.61 per person randomized to the telephone group to achieve a mean 0.36 percentage point of A1C improvement. The incremental cost-effectiveness ratio was $490.58 per incremental percentage point of A1C improvement and $2,617.35 per person over a 1-year intervention in achieving the A1C goal. In probabilistic sensitivity analysis, the median (interquartile range) of per capita cost, cost per percentage point reduction in A1C, and cost per person achieving the A1C goal of <7% are $175.82 (147.32-203.56), $487.75 (356.50-718.32), and $2,312.88 (1,785.58-3,220.78), respectively.

**CONCLUSIONS:** The costs of a telephonic intervention for diabetes self-management support are moderate and commensurate to the modest associated improvement in glycemic control

Kogut S. J., et al., “Evaluation of a program to improve diabetes care through intensified care management activities and diabetes medication copayment reduction” *Journal of Managed Care Pharmacy* 18(4) (May 2012): 297 - 310

**Conclusions:** Patients participating in this incentive program featuring diabetes medication copayment reduction and disease management components did not receive recommended care any more or less frequently than other enrolled members with diabetes. Younger patients and those utilizing oral antidiabetic monotherapy as their drug regimens were less likely to have the recommended processes of care performed. While prescription drug expenditures incurred by the plan were greater for intervention patients, between-group differences in total costs for medications and all-cause medical care were not statistically significant. Further follow-up is required to determine the success of this program over the longer term in promoting quality of care and achieving cost reductions and improved health outcomes.

Schmeida, M. and R. A. Savrin “Pneumonia rehospitalization of the Medicare fee-for-service patient: a state-level analysis: exploring 30-day readmission factors” *Professional Case Management* 3 (May/June 2012):126 – 131.

**Purpose of the Study:** Pneumonia hospitalization and subsequent readmission among the elderly are frequent and costly both to patient and to the Medicare trust fund. In this study, we explored the factors that are associated with states having pneumonia readmission rates that are higher than the U.S. national rate.

**Primary Practice Setting(s):** Acute inpatient hospital settings.

**Methodology and Sample:** Fifty state-level data and multivariate regression analysis were used. The dependent variable pneumonia 30-day readmission worse than U.S. rate was based on adult Medicare fee-for-service patients hospitalized with a primary discharge diagnosis of pneumonia and for which a subsequent inpatient readmission occurred within 30 days of their last discharge.

**Results:** Two key variables--discharge information given to the patient and giving correct initial antibiotic(s)--explain a decreased chance for states ranking "worse" on pneumonia 30-day readmission. States with a higher percentage of White Medicare enrollees, a higher median income, more total days of care, and more Medicare enrollees with prescription drug coverage have a greater chance for pneumonia 30-day readmission to be worse than the U.S. national rate.

**Implications for Case Management Practice:** Case management interventions targeting (1) inpatient clinical processes on antibiotic treatment and (2) patient discharge instructions may be more effective than other factors to improve state-level hospital performance on pneumonia 30-day readmission. Improving patient access to postdischarge medication(s) may not be as important a factor as are antibiotic treatment and patient discharge preparedness. Hospital programs aimed to prevent readmission disparities should not overlook nonminority and higher income population groups.

Gabbaya, R., et al., “Nurse case management improves blood pressure, emotional distress and diabetes complication screening” *Diabetes Research and Clinical Practice* 71(1) (January 2006): 28 -35.

We studied the impact of nurse case management (NCM) on blood pressure (BP), hemoglobin A1C, lipids, and diabetes complication screening.

A 1-year randomized-controlled trial was conducted in two primary care clinics of the Penn State Hershey Medical Center. Diabetes patients were randomized to control group (CG) (n = 182) who received usual care by their primary care provider and intervention group (IG) (n = 150) who received additional NCM care, including self-management education, and implementation of diabetes guidelines. Primary outcomes included BP, A1C, lipid, process measures, and secondary outcome was diabetes-related emotional distress as assessed by Problem Areas in Diabetes (PAID).

BP significantly decreased from 137/77 to 129/72 in IG as compared to an increase from 136/77 to 138/79 in CG after 1 year. PAID scores improved significantly in IG (from 23 to 10) due to reduced emotional stress. A1C (7.4) and LDL (105) were unaffected. Complications screening significantly improved in IG compared to CG: opthalmologic exam 26 to 68%, foot exam 47 to 64%, and nephropathy screening 34 to 72%.

NCM improved BP, diabetes-related emotional distress, and process measures in primary care. Unchanged A1C and lipids might be due to a threshold effect. Intervention based upon initial risk assessment may prove more cost-effective.

Kainzinger, F., et al., “Optimization of hospital stay through length-of-stay-oriented case management: an empirical study” *Journal of Public Health* 17(6) (2009): 395 – 400.

**Background and objectives:** An important component of efficient and high-quality treatment of patients under DRG conditions is the control of patients’ length of stay in hospitals. Medical processes need to be structured in such a way that unnecessary extensions of the length of stay are avoided, thus achieving an economically and qualitatively optimal result. The study presented here examines the question of whether the introduction of length-of-stay-oriented case management can optimize the duration of patients' hospital stays.

**Methods:** In total, 168 inpatient cases and their matched control cases from the cardiology and urology stations of a maximum care hospital are examined in this study.

**Results:** The result of the t-test for the difference of means indicates that the average length of stay of the intervention cases (5.79 days) was significantly shorter than the average length of stay of the control cases (7.34 days). With respect to the re-admission rate, a statistically significant dependence could not be determined.

**Discussion and conclusion:** The operationalization of case management in daily clinical routines was tested by a comprehensive survey. Length-of-stay-oriented case management provides transparency of the entire treatment process and integrates procedures to an optimal extent. However, the doctor's sovereignty over therapy is not affected by the introduction of length-of-stay-oriented case management. Hence, the form of case management presented here serves as a new and innovative control and monitoring system for hospitals, as it makes institutions that implement such a system more competitive through the improvement of economical aspects as well as through the introduction of higher process efficiency.

Douglas, S., et al., “Chronically Critically Ill Patients: Health-Related Quality of Life and Resource Use After a Disease Management Intervention” *American Journal of Critical Care* 16(5) (September 2007): 447 – 457.

**Background:** Chronically critically ill patients often have high costs of care and poor outcomes and thus might benefit from a disease management program.

**Objectives:**  To evaluate how adding a disease management program to the usual care system affects outcomes after discharge from the hospital (mortality, health-related quality of life, resource use) in chronically critically ill patients.

**Methods:** In a prospective experimental design, 335 intensive care patients who received more than 3 days of mechanical ventilation at a university medical center were recruited. For 8 weeks after discharge, advanced practice nurses provided an intervention that focused on case management and interdisciplinary communication to patients in the experimental group.

**Results:** A total of 74.0% of the patients survived and completed the study. Significant predictors of death were age (P = .001), duration of mechanical ventilation (P = .001), and history of diabetes (P = .04). The disease management program did not have a significant impact on health-related quality of life; however, a greater percentage of patients in the experimental group than in the control group had “improved” physical health-related quality of life at the end of the intervention period (P = .02). The only significant effect of the intervention was a reduction in the number of days of hospital readmission and thus a reduction in charges associated with readmission.

**Conclusion:** The intervention was not associated with significant changes in any outcomes other than duration of readmission, but the supportive care coordination program could be provided without increasing overall charges.

Wells, A.R., et al., “Exploring Robust Methods for Evaluating Treatment and Comparison Groups in Chronic Care Management Programs” *Population Health Management* 16(1) (February 2013): 35 – 45.

Evaluation of chronic care management (CCM) programs is necessary to determine the behavioral, clinical, and financial value of the programs. Financial outcomes of members who are exposed to interventions (treatment group) typically are compared to those not exposed (comparison group) in a quasi-experimental study design. However, because member assignment is not randomized, outcomes reported from these designs may be biased or inefficient if study groups are not comparable or balanced prior to analysis. Two matching techniques used to achieve balanced groups are Propensity Score Matching (PSM) and Coarsened Exact Matching (CEM). Unlike PSM, CEM has been shown to yield estimates of causal (program) effects that are lowest in variance and bias for any given sample size. The objective of this case study was to provide a comprehensive comparison of these 2 matching methods within an evaluation of a CCM program administered to a large health plan during a 2-year time period. Descriptive and statistical methods were used to assess the level of balance between comparison and treatment members pre matching. Compared with PSM, CEM retained more members, achieved better balance between matched members, and resulted in a statistically insignificant Wald test statistic for group aggregation. In terms of program performance, the results showed an overall higher medical cost savings among treatment members matched using CEM compared with those matched using PSM (-$25.57 versus -$19.78, respectively). Collectively, the results suggest CEM is a viable alternative, if not the most appropriate matching method, to apply when evaluating CCM program performance.

Aaltje, P.D., et al., “Cost-effectiveness of case-management by district nurses among primary informal caregivers of older adults with dementia symptoms and the older adults who receive informal care: design of a randomized controlled trial” *BMC Public Health* 12(5) (December 2005): 133

**Background:** Dementia is an incurable disease with devastating consequences for both patients and their relatives. The objective of this study is to describe the study protocol of a randomized controlled trial with assignment to either usual care or case-management by district nurses, among informal caregivers of older adults with dementia symptoms who live at home and the older adults who receive informal care.

**Methods/design:** In this randomized controlled trial, effectiveness as well as cost-effectiveness of case-management is evaluated. It concerns case-management in early-detected patients with dementia symptoms and their primary informal caregivers. Participants are followed up to twelve months after baseline assessment. The main outcome measure of the effect evaluation is the caregiver's sense of competence to care for the older person with dementia symptoms. The economic evaluation is performed from a societal perspective.

**Discussion:** This is one of the first trials on case-management that includes an economic evaluation. In addition, it concerns a tailor-made intervention in early-detected patients with dementia symptoms and their caregivers. The results of this randomized controlled trial will provide valuable information for health professionals and policy makers on effectiveness and cost-effectiveness of early tailor-made case-management for patients and their informal caregivers. Moreover, positive effects will challenge current health care systems to move to more pro-active approaches for this group.

*Here is the link for the full article….it never talks about the financial impact.* [*http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1327666/*](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1327666/)

Grabowski, D. “The Cost-Effectiveness of Noninstitutional Long-Term Care Services: Review and Synthesis of the Most Recent Evidence” Medical Care Research and Review” 63(1) (February 2006): 23 – 28.

There has been significant expansion and change in the financing, coverage, and delivery of home-and community-based services during the past decade. This article reviews the cost-effectiveness of Medicaid waiver programs, consumer-directed care, capitated models that blend acute and long-term care services, and case management and subsidized community services for individuals with dementia. Generally, these new care models were found to be associated with increased costs, but greater client and caregiver welfare. Depending on the specific features of the program, capitated care models and consumer directed care were identified as potential mechanisms toward providing services more efficiently. Importantly, however, most recent evaluations have relied on potentially confounded research designs, which leaves open the question of whether the findings relate to the programs or biased selection across the treatment and comparison groups.

Paez K, Allen J. “Cost-effectiveness of nurse practitioner management of hypercholesterolemia following coronary revascularization” *Journal of the American Academy of Nurse Practitioners* 18(9) (September 2006): 436 – 444.

**Purpose:** To evaluate the cost-effectiveness of case management by a nurse practitioner (NP) to lower blood lipids in patients with coronary heart disease (CHD) from a managed care perspective.

**Data sources:** A total of 228 consecutive, eligible adults with hypercholesterolemia and CHD were recruited during hospitalization after coronary revascularization. Patients were randomized to receive lipid management, including individualized lifestyle modification and pharmacologic intervention from an NP for 1 year after discharge in addition to their usual care (NURS) or to receive usual care (EUC) enhanced with feedback on lipids to their primary provider and/or cardiologist. A cost-effectiveness ratio was calculated using incremental costs of the NURS group per unit change and percent change in low-density lipoprotein cholesterol (LDL-C) for 1 year at 2004 values.

**Conclusions:** The annual incremental cost-effectiveness of NP case management was $26.03 per mg/dL and $39.05 per percent reduction in LDL-C. When costs of NURS care for the second 6 months of management were compared to the first 6 months of management, nursing salary costs were lower as patients were established on cholesterol management regimens, but the reduction in costs was offset by the increase in incremental costs of drug treatment as the NP titrated the patient to higher drug dosages that were more costly.

**Implications for practice:** The findings suggest that case management by an NP is a cost-effective approach for a managed care organization to consider in improving the care of patients with cardiovascular disease.

Handley, M., et al., “Cost-Effectiveness of Automated Telephone Self-Management Support With Nurse Care Management Among Patients With Diabetes” *The Annals of Family Medicine* 6(6) (November 2008): 512 – 518

**Purpose:** This study evaluated the cost-effectiveness of an automated telephone self-management support with nurse care management (ATSM) intervention for patients with type 2 diabetes, which was tested among patients receiving primary care in publicly funded (safety net) clinics, focusing on non-English speakers.

**Methods:** We performed cost analyses in the context of a randomized trial among primary care patients comparing the effects of ATSM (n = 112) and usual care (n = 114) on diabetes-related outcomes in 4 San Francisco safety net clinics. ATSM uses interactive phone technology to provide surveillance, patient education, and one-on-one counseling, and was implemented in 3 languages for a 9-month period. Cost utility was examined using quality-adjusted life-years (QALYs) derived from changes in scores on the 12-Item Short Form Health Survey. We also examined cost-effectiveness for costs associated with a 10% increase in the proportion of patients meeting diabetes-specific public health goals for increasing exercise, as recommended by Healthy People 2010 and the American Diabetes Association.

**Results:** The annual cost of the ATSM intervention per QALY gained, relative to usual care, was $65,167 for start-up and ongoing implementation costs combined, and $32,333 for ongoing implementation costs alone. In sensitivity analyses, costs per QALY ranged from $29,402 to $72,407. The per-patient cost to achieve a 10% increase in the proportion of intervention patients meeting American Diabetes Association exercise guidelines was estimated to be $558 when all costs were considered and $277 when only ongoing costs were considered.

**Conclusions:**  The ATSM intervention for diverse patients with diabetes had a cost utility for functional outcomes similar to that of many other accepted interventions targeted at diabetes prevention and treatment, and achieved public health physical activity objectives at modest costs. Because a considerable proportion of costs were fixed, cost-utility and cost-effectiveness estimates would likely be substantially improved in a scaled-up ATSM program.

Vanderplasschena, W., et al., “Effectiveness of Different Models of Case Management for Substance-Abusing Populations” *Journal of Psychoactive Drugs* 39(1) (2007): 81 – 95.

Case management has been implemented in substance abuse treatment to improve (cost-) effectiveness, but controversy exists about its potential to realize this objective. A systematic and comprehensive review of peer-reviewed articles (n = 48) published between 1993 and 2003 is presented, focusing on the effects of different models of case management among various substance-abusing populations. Results show that several studies have reported positive effects, but only some randomized and controlled trials have demonstrated the effectiveness of case management compared with other interventions. Longitudinal effects of this intervention remain unclear. Although no compelling evidence was found for the effectiveness of case management, some evidence is available about the (differential) effectiveness of intensive case management and assertive community treatment for homeless and dually-diagnosed substance abusers. Strengths-based and generalist case management have proven to be relatively effective for substance abusers in general. Most positive effects concern reduced use of inpatient services and increased utilization of community-based services, prolonged treatment retention, improved quality of life, and high client satisfaction. Outcomes concerning drug use and psychosocial functioning are less consistent, but seem to be mediated by retention in treatment and case management. Further research is required to learn more about the extent of the effects of this intervention, how long these are sustained and what specific elements cause particular outcomes.

Crémieux, P.Y., et al., “A Study on the Economic Impact of Bariatric Surgery”. *The American Journal of Managed Care* Volume 14 Number 9 (September 2008): 589 – 596

**Objective:** To evaluate the private third-party payer return on investment for bariatric surgery in the United States.

**Study Design:** Morbidly obese patients aged 18 years or older were identified in an employer claims database of more than 5 million beneficiaries (1999-2005) using International Classification of Diseases, Ninth Revision, Clinical Modification code 278.01. Each of 3651 patients who underwent bariatric surgery during this

period was matched to a control subject who was morbidly obese and never underwent bariatric surgery. Bariatric surgery patients and controls were matched based on patient demographics, selected comorbidities, and costs.

Methods: Total healthcare costs for bariatric surgery patients and their controls were recorded for 6 months before surgery through the end of their continuous enrollment. To account for potential differences in patient characteristics, we calculated the cost differential by estimating a Tobit model. A return on investment was estimated from the resulting coefficients. Costs were inflation adjusted to 2005 US dollars using the Consumer Price Index for Medical Care, and the cost savings were discounted by 3.07%, the 3-month Treasury bill rate during the same period.

**Results:** The mean bariatric surgery investment ranged from approximately $17,000 to $26,000. After controlling for observable patient characteristics, we estimated all costs to have been recouped within 2 years for laparoscopic surgery patients and within 4 years for open surgery patients.

**Conclusions:** Downstream savings associated with bariatric surgery are estimated to offset the initial costs in 2 to 4 years. Randomized or quasiexperimental studies would be useful to confirm this conclusion, as unobserved characteristics may influence the decision to undergo surgery and cannot be controlled for in this analysis.

Markle, A. “The Economic Impact of Case Management”. *The Case Manager* (July/August 2004): 54 - 58”

**Conclusion:** CM has demonstrated success in the reduction of health care expenses. It will continue to evolve as a strong method to identify issues, obtain resources for patients, families, clinicians, and organizations, and evaluate the use of those resources. The case manager strives to balance the mission of quality care with the organization’s costs and the wellbeing of the patient. CM has and will continue to have a positive economic impact on our health care system.

Krein, S. L., et al., “Case Management for Patients with Poorly Controlled Diabetes: A Randomized Trial.” *American Journal of Medicine* 116 (2004): 732–739.

**Purpose:** To evaluate the effects of a collaborative case management

intervention for patients with poorly controlled type 2 diabetes on glycemic control, intermediate cardiovascular outcomes, satisfaction with care, and resource utilization.

METHODS: We conducted a randomized controlled trial at two Department of Veterans Affairs Medical Centers involving 246 veterans with diabetes and baseline hemoglobin A1C (HbA1C) levels ≥7.5%. Two nurse practitioner case managers worked with patients and their primary care providers, monitoring and coordinating care for the intervention group for 18 months through the use of telephone contacts, collaborative goal setting, and treatment algorithms. Control patients received educational materials and usual care from their primary care providers.

**Results:** At the conclusion of the study, both case management and control patients remained under poor glycemic control and there was little difference between groups in mean exit HbA1C level (9.3% vs. 9.2%; difference = 0.1%; 95% confidence interval: - 0.4% to 0.7%; P=0.65). There was also no evidence that the intervention resulted in improvements in low-density lipoprotein cholesterol level or blood pressure control or

greater intensification in medication therapy. However, intervention patients were substantially more satisfied with their diabetes care, with 82% rating their providers as better than average compared with 64% of patients in the control group (P = 0.04).

**Conclusion:** An intervention of collaborative case management did not improve key physiologic outcomes for high risk patients with type 2 diabetes. The type of patients targeted for intervention, organizational factors, and program structure are likely critical determinants of the effectiveness of case management. Health systems must understand the potential limitations before expending substantial resources on case management, as the expected improvements in outcomes and downstream cost savings may not always be realized.

Kumar, G. S. and R. Klein “Effectiveness Of Case Management Strategies In Reducing Emergency Department Visits In Frequent User Patient Populations: A Systematic Review” *The Journal of Emergency Medicine* (2012): 1–13

**Abstract:** Background: Case management (CM) is a commonly cited intervention aimed at reducing Emergency Department (ED) utilization by ‘‘frequent users,’’ a group of patients that utilize the ED at disproportionately high rates. Studies have investigated the impact of CM on a variety of outcomes in this patient population.

**Objectives:** We sought to examine the evidence of the effectiveness of the CM model in the frequent ED user patient population. We reviewed the available literature focusing on the impact of CM interventions on ED utilization, cost, disposition, and psychosocial variables in frequent ED users.

**Discussion:** Although there was heterogeneity across the 12 studies investigating the impact of CM interventions on frequent users of the ED, the majority of available evidence shows a benefit to CM interventions. Reductions in ED visitation and ED costs

are supported with the strongest evidence.

**Conclusion:** CM interventions can improve both clinical and social outcomes among frequent ED users.

**Conclusion:** From our review, CM seems to be successful in improving both clinical and social outcomes among frequent ED users. Reductions in ED visitation and ED costs are supported with the strongest evidence. The breadth of resources and intensity of intervention seems to correlate with better outcomes. Although the current literature supports the benefits of CM interventions, additional investigation is needed to determine what specific aspects of CM are most successful and cost effective. In addition, studies targeting especially challenging populations of high utilizers, including patients with substance abuse and psychiatric disorders and those with the highest frequency of ED use, are needed.

Taylor, J. K., et al., “Strategies for Identifying and Channeling Patients for Depression Care Management” *The American Journal of Managed Care* 14(8) (2008): 497- 504.

**Conclusion:** A multipronged effort composed of mail screening (using the PHQ-2), self-reported antidepressant use, and claims diagnoses of depression may capture the greatest number of enrollees with possible depression.

Weintraub, A., et al., “A Multicenter Randomized Controlled Evaluation of Automated Home Monitoring and Telephonic Disease Management in Patients Recently Hospitalized for Congestive Heart Failure: The SPAN-CHF II Trial” *Journal of Cardiac Failure* 16(4) (2010): 285 – 292.

**Background:** We performed a prospective, randomized investigation assessing the incremental effect of automated health monitoring (AHM) technology over and above that of a previously described nurse directed heart failure (HF) disease management program. The AHM system measured and transmitted body weight, blood pressure, and heart rate data as well as subjective patient self-assessments via a standard

telephone line to a central server.

**Methods and Results:** A total of 188 consented and eligible patients were randomized between intervention and control groups in 1:1 ratio. Subjects randomized to the control arm received the Specialized Primary and Networked Care in Heart Failure (SPAN-CHF) heart failure disease management program. Subjects randomized to the intervention arm received the SPAN-CHF disease management program in conjunction with the AHM system. The primary end point was prespecified as the relative event rate of HF hospitalization between intervention and control groups at 90 days. The relative event rate of HF hospitalization for the intervention group compared with controls was 0.50 (95%CI [0.25 - 0.99], P = .05).

**Conclusions:** Short-term reductions in the heart failure hospitalization rate were associated with the use of automated home monitoring equipment. Long-term benefits in this model remain to be studied.

Schmeida, M. and R. Savrin “Heart Failure Rehospitalization of the Medicare FFS Patient A State-Level Analysis Exploring 30-Day Readmission Factors” *Professional Case Management* 17(4) (2012): 155-161.

**Purpose of Study:** Heart failure readmission among the elderly is frequent and costly to both the patient and the Medicare trust fund. In this study, the authors explore the factors that are associated with states having heart failure readmission rates that are higher than the U.S. national rate.

**Primary Practice Setting(s):** Acute inpatient hospital settings

**Methodology and Sample:** 50 state-level data and multivariate regression analysis is used. The dependent variable Heart Failure 30-day Readmission Worse than U.S. Rate is based on adult Medicare Fee-for-Service patients hospitalized with a primary discharge diagnosis of heart failure and for which a subsequent inpatient readmission occurred within 30 days of their last discharge.

**Results:** One key variable found—states with a higher resident population speaking a primary language other than English at home—that is significantly associated with a decrease in probability in states ranking “worse” on heart failure 30-day readmission. Whereas, states with a higher median income, more total days of care per 1,000 Medicare enrollees, and a greater percentage of Medicare enrollees with prescription drug coverage have a greater probability for heart failure 30-day readmission to be “worse” than the U.S. national rate.

**Implications for Case Management Practice:** Case management interventions targeting health literacy may be more effective than other factors to improve state-level hospital status on heart failure 30-day readmission. Factors such as total days of care per 1,000 Medicare enrollees and improving patient access to postdischarge medication(s) may not be as important as literacy. Interventions aimed to prevent disparities should consider higher income population groups as vulnerable for readmission.

**SUMMARY:** Our research presents two counterintuitive findings. States with greater total days of care per 1,000 Medicare enrollees and prescription drug coverage have a greater chance for heart failure 30-day readmission to be “worse” than the U.S. national rate. More study is needed to explore this finding. The authors also find that states with more residents speaking a primary language other than English at home are associated with a lesser chance for ranking “worse” on heart failure 30-day readmission.

Although further study is required, it does suggest that federal and/or state-level legislation passed to improve access to services for persons with limited English proficiency (Executive Order 13166, 2000) may be influencing better provision of care for this population. The Centers for Medicare & Medicaid Services should consider targeting these variables in effort to improve state ranking on heart failure 30-day readmission.

Shumway, M., et al., “Cost-effectiveness of clinical case management for ED frequent users: results of a randomized trial” *American Journal of Emergency Medicine* 26 (2008): 155–164.

**Objective:** The objective of the study was to test the hypothesis that clinical case management is more cost-effective than usual care for frequent users of the emergency department (ED).

**Methods:** The study is a 24-month randomized trial obtaining data on psychosocial problems through interviews and service usage and cost data from administrative records.

**Results:** Two-hundred fifty-two frequent users were randomized (167 to case management, 85 to usual care). Case management was associated with statistically significant reductions in psychosocial problems common among ED frequent users, including homelessness, alcohol use, lack of health insurance and social security income, and financial need. Case management was associated with statistically significant reductions in ED use and cost. Case management and usual care patients did not differ in use or cost of other hospital services.

**Conclusions:** Case management appears cost-effective for ED frequent users because it yields statistically and clinically significant reductions in psychosocial problems at a cost similar to that of usual care.

Results of a 2-year randomized trial demonstrate that clinical case management is more cost-effective than usual care for frequent users of the ED. Case management was associated with statistically and clinically significant reductions in psychosocial problems common among frequent ED users and with statistically and practically significant reductions in ED use and cost. When the costs of the case management intervention were considered, total hospital service costs were similar for case management and usual care patients. Thus, case management is cost-effective because it improves psychosocial outcomes for frequent ED users without increasing hospital service costs.

Fleischman, R. J., et al., “Is futile care in the injured elderly an important target for cost savings?” *Journal of Trauma Acute Care Surg*ery 73(1) (2012): 146 – 151.

**Background:** This study proposes a definition of futile care and quantifies its cost in injured elders.

**Methods:** This was a retrospective study of Medicare patients with an International Classification of Diseases-9 injury diagnosis admitted to 171 Oregon and Washington facilities from January 1, 2001, through December 31, 2002, who died within 6 months of admission. Futile care was defined as death within 7 days of discharge from a hospitalization of at least 14 days. We compared health care costs in the last 6 months of life with those who did and did not meet our definition of futility. To simulate predicting

and preventing futility early in the hospital course, we examined the effect of reducing spending on the futile care cohort to the level of those who survived 7 to 10 days after injury.

**Results:** There were 6,832 elders who died within 6 months of injury, of whom 230 (3.4%) met our definition of futility. The median cost of care in the last 6 months of life was $33,373 for those not meeting our definition of futility and $87,391 for the futile care

group (p < 0.001). The 3.4% receiving futile care incurred 8.9% of total costs. Reducing expenditures in the futile care group to the level of those who died from 7 to 10 days after injury (median, $25,633) would result in an overall cost savings of 6.5%.

**Conclusion:** End-of-life health care costs were significantly higher for those who received futile care. However, even aggressive reductions in futile care would result in small savings overall.

Gravelle, H., et al., “Impact of case management (Evercare) on frail elderly patients: controlled before and after analysis of quantitative outcome data” *British Medical Journal* (2006)

**Conclusions:** Case management of frail elderly people introduced an additional range of services into primary care without an associated reduction in hospital admissions. This may have been because of identification of additional cases. Employment of community matrons is now a key feature of case management policy in the NHS in England. Without more radical system redesign this policy is unlikely to reduce hospital admissions.

Huber, D. L., et al., “Acuity and Case Management A Healthy Dose of Outcomes, Part I” *Professional Case Management* 12(3) (2007): 132–146.

**Results:** Positive results generated approval from the expert review panel to apply the suite of acuity tools beyond (1) the initial draft phase, (2) the test population phase, and then (3) at a national CM organization level.

**Implications for Case Management Practice:** This article defines and discusses acuity and dosage as two practical conceptual tools that successfully unite clinical quality and business practices and measure and analyze CM activities. The CM Acuity Tool© is a master conceptual framework in three dimensions that synthesizes key components of CM practice, organized into indicators, drivers, and subdrivers. To show value, case managers need to access the evidence base for practice, use tools to capture quantities of intervention-intensity, and specify the activities that produce better outcomes.

**CONCLUSION:** In business language, CM interventions corresponding to prescribed dosages of CM practice result in outcomes that can be predicted and replicated. In practical application, the acuity concept associates severity of clients’ illnesses (or situations) to intensity of CM interventions or responses (Craig, 2005).

Together, dosage and acuity offer the CM outcomes portfolio useful and effective instruments for case managers to measure the worth of their practice. In Parts II and III of this series, the Acuity Tools Project is presented in greater depth. The two measurement instruments, CM Acuity Tool© and AccuDiff©, are described and discussed. Their purposes of improving communications regarding the dimensions of CM practice and making the business case for CM practice by valid measurements of specific components of CM are explained. Part III explains how to apply the acuity instruments in CM practice to make comparisons between CM cases that enable quality

improvements and outcomes tracking despite the complexity found in CM.

Craig, K., et al., “Acuity and Case Management A Healthy Dose of Outcomes, Part II” *Professional Case Management* 12(4) (2007): 199 – 210.

**Results:** The Acuity Tools suite was used to calculate individual case acuity, overall caseload acuity profiles, case length, and acuity differentials. Normal distributions and outliers were analyzed and the results used for internal quality improvement and outcomes monitoring.

**Implications for Case Management Practice:** To show value, case managers need to access the evidence base for practice, use tools to capture quantities of intervention intensity, and specify precisely the activities that produce better outcomes. Acuity and dosage can help case managers explore and fully describe their own practice in ways that can be measured. This data-driven evidence contributes to the accumulating body

of definitive proof regarding the exceptional worth of CM. Proving business and professional worth in CM though evidence-based practice is a clarion call that case managers must heed and an innovation that all case managers can practice.

**CONCLUSION:** Acuity and dosage can help case managers explore and fully describe their own practice in ways that can be measured. The cornerstone concepts of client need severity, CM intervention-intensity, dosage activity prescription, and complexity that underpin acuity aid case managers in this endeavor. Measurements of dosage, acuity, and changes in acuity, which are based in authentic CM practice, provide data and evidence that contribute to the accumulating body of definitive proof regarding the exceptional worth of CM. Proving business and professional worth in CM though EBP is

a clarion call that case managers must heed and an innovation that all case managers can practice.

Huber, D. L., et al., “Acuity and Case Management A Healthy Dose of Outcomes, Part III” *Professional Case Management* 12(5) (2007): 254 – 269.

**Results:** The Acuity Tools Suite was used to calculate individual case acuity, overall caseload acuity profiles, case length, and acuity differentials. Normal distributions and outliers were analyzed and the results were used for internal quality improvement and outcomes monitoring.

**Implications for CM Practice:** To show value, case managers need to access the evidence base for practice, use tools to capture quantities of intervention intensity, and precisely specify the activities that produce better outcomes. Acuity and dosage can help case managers explore and fully describe their own practice in ways that can be measured, and thus provide data and evidence that contributes to the accumulating body of definitive proof regarding the exceptional worth of CM. Proving business and professional worth in CM through EBP is a clarion call that case managers must heed and an innovation that all case managers can practice.

Peikes, D., et al., “Effects of Care Coordination on Hospitalization, Quality of Care, and Health Care Expenditures Among Medicare Beneficiaries 15 Randomized Trials” *Journal of American Medical Association* 301(6) (2009): 603 – 618.

**Context**: Medicare expenditures of patients with chronic illnesses might be reduced through improvements in care, patient adherence, and communication.

**Objective:** To determine whether care coordination programs reduced hospitalizations

and Medicare expenditures and improved quality of care for chronically ill Medicare

beneficiaries.

**Design, Setting, and Patients:** Eligible fee-for-service Medicare patients (primarily with congestive heart failure, coronary artery disease, and diabetes) who volunteered to participate between April 2002 and June 2005 in 15 care coordination programs (each received a negotiated monthly fee per patient from Medicare) were randomly assigned to treatment or control (usual care) status. Hospitalizations, costs, and some quality-of-care outcomes were measured with claims data for 18 309 patients (n=178 to 2657 per program) from patients’ enrollment through June 2006. A patient survey 7 to 12 months after enrollment provided additional quality-of-care measures.

**Interventions**: Nurses provided patient education and monitoring (mostly via telephone) to improve adherence and ability to communicate with physicians. Patients were contacted twice per month on average; frequency varied widely.

**Main Outcome**: Measures Hospitalizations, monthly Medicare expenditures, patient reported and care process indicators.

**Results:** Thirteen of the 15 programs showed no significant (P < .05) differences in hospitalizations; however, Mercy had 0.168 fewer hospitalizations per person per year (90% confidence interval [CI], −0.283 to −0.054; 17% less than the control group mean, P=.02) and Charlestown had 0.118 more hospitalizations per person per year (90% CI, 0.025-0.210; 19% more than the control group mean, P=.04). None of the 15 programs generated net savings. Treatment group members in 3 programs (Health Quality Partners [HQP], Georgetown, Mercy) had monthly Medicare expenditures less than the control group by 9% to 14% (−$84; 90% CI, −$171 to $4; P=.12; −$358; 90% CI, −$934 to $218; P=.31; and −$112; 90% CI, −$231 to $8; P=.12; respectively).

Savings offset fees for HQP and Georgetown but not for Mercy; Georgetown was too small to be sustainable. These programs had favorable effects on none of the adherence measures and only a few of many quality of care indicators examined.

**Conclusions**: Viable care coordination programs without a strong transitional care component are unlikely to yield net Medicare savings. Programs with substantial in person contact that target moderate to severe patients can be cost-neutral and improve some aspects of care.

Crane, S., et al., “Reducing Utilization by Uninsured Frequent Users of the Emergency Department: Combining Case Management and Drop-in Group Medical Appointments” *Journal of the American Board of Family Medicine* 25 (2012):184 –191.

**Background:** Patients with complex behavioral health and medical problems can have a disproportionate impact on emergency departments.

**Methods:** We identified a cohort of 255 low-income, uninsured patients who had used inpatient or emergency department services more than 6 times in the previous 12 months. Between July 2010 and June 2011 we enrolled 36 of these high-risk patients to participate in a twice-weekly drop-in group medical appointment staffed by an interdisciplinary team of a family physician, behavioral health professional, and nurse case manager. The team provided 705 patient visits in a group setting (a total of 108 group sessions) and 652 case manager phone calls. The average number of clients per drop-in group medical appointment was 6.5.

**Results:** Emergency department use dropped from a rate of 0.58 per patient per month to 0.23 (P < .001), and hospital charges dropped from $1167 per patient per month to $230 (P < .001). Employment status increased from 4 to 14 among the 36 patients enrolled. Total annualized cost of the program was $66,000.

**Conclusions:** Team-based drop-in group medical appointments coupled with case management seem to be a cost-effective model to reduce emergency department visits by some patients with complex behavioral health and medical needs.

**Specialty Case Management**

**Demand Management**

**Population Management**

[Stange, K.C., et al., “Defining and Measuring the Patient-Centered Medical Home.”](#PH) *[Journal of General Internal Medicine.](#PH)* [25(6) (June 2010): 601–612](#PH).

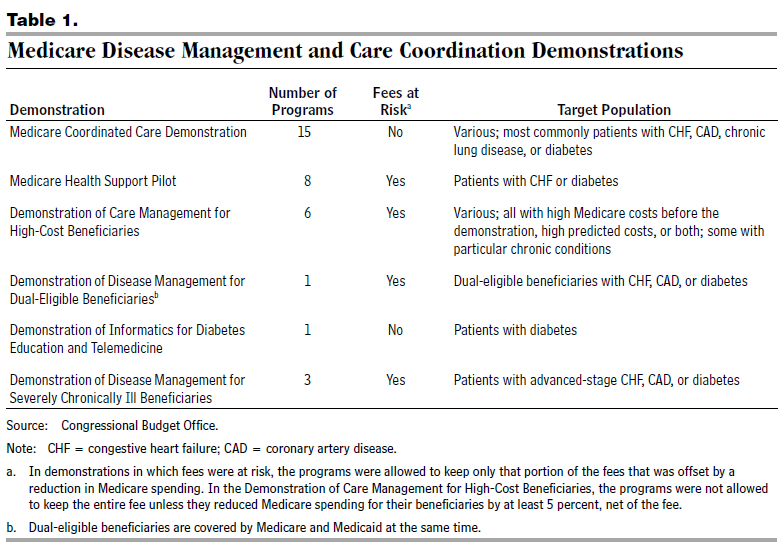
**Disease Management**

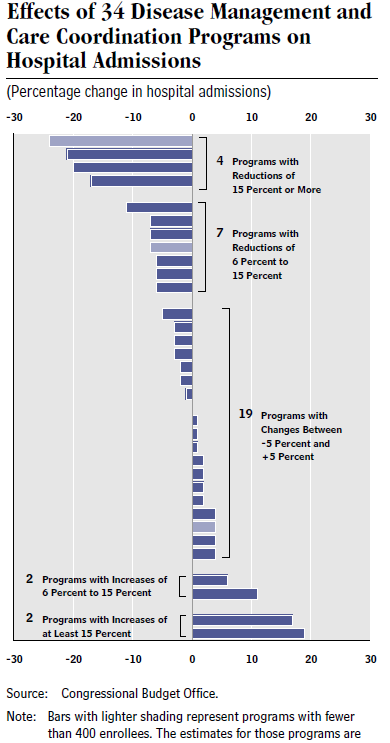
Irizarry, L., et al., “Effects of cancer comorbidity on disease management: making the case for diabetes education (a report from the SOAR program).” Population Health Management 16(1) (February 2013): 53 – 57.

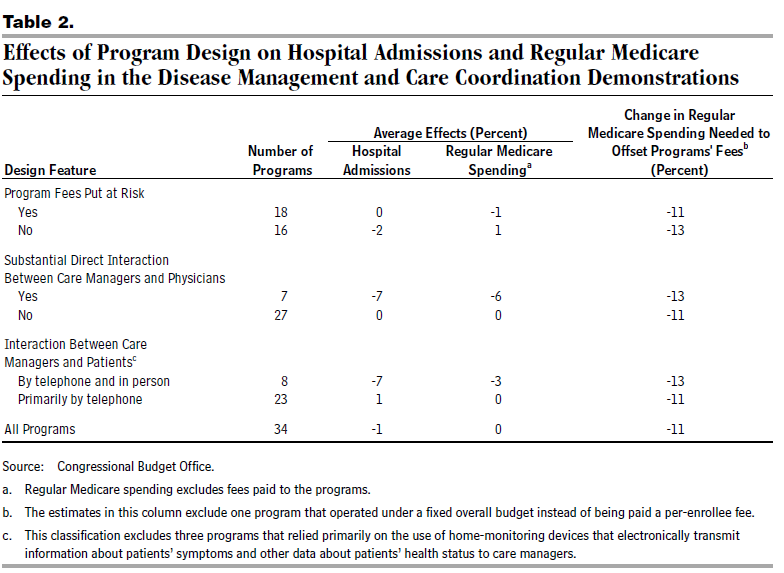
Individuals with type II diabetes have an increased risk of cancer diagnosis (relative risk [RR]=1.12-2.50) and mortality (RR=1.4) compared to normoglycemic individuals. Biologic mechanisms, including mitogenic effects of insulin, hyperglycemia, and increased oxidative stress, as well as behavioral factors (eg, difficulty managing the comorbidity) may explain the elevated risk. To investigate the effects of the comorbidity on disease management, the authors compared diabetes education utilization in individuals with diabetes-cancer co-morbidity to utilization by individuals with diabetes in the absence of cancer. The effect of diabetes education on outcomes was further assessed in the subset of individuals with diabetes-cancer comorbidity. Administrative claims data were used for this analysis. The study population included individuals >60 years of age and members of both commercial and Medicare Advantage health plans from a private national database of payer data, but excluded Medicare fee for service and Medicaid patients. Most of these individuals were eligible to receive reimbursement for diabetes education. Diabetes education utilization was identified using procedure codes. Outcomes were assessed for a 3-year time period. There was little difference in diabetes education utilization between individuals with diabetes in the absence of cancer (3.8% utilization) and those with diabetes-cancer comorbidity (3.5% utilization). Individuals who receive diabetes education are more likely to have multiple HbA1c tests per year, fewer emergency department visits, fewer hospital admissions, and lower care-associated costs (except for outpatient and pharmacy averages). When diabetes coexists with cancer, management of diabetes often lags, making diabetes education an imperative.

**Conclusions:** Despite the limitations mentioned, our findings suggest a benefit of diabetes education in individuals older than age 60 with comorbid diabetes and cancer. Individuals who received diabetes education were more likely to have regular outpatient follow-up (HBA1c testing), which results in fewer hospitalizations, lower health care expenditures, and fewer ED visits. Despite these potential benefits, diabetes education was underutilized. In the total study population, only 3.8% of individuals received diabetes education and only 3.5% of individuals with diabetes – cancer comorbidity utilized diabetes education. Considering that prior studies also have shown that individuals with this comorbidity have a worse prognosis that those with cancer Alone, physicians and mid-level provider must prioritize diabetes education and must advocate for its expanded utilization in the care of patients who are balancing both disease. Future studies are needed to investigate the impact of diabetes education on cancer-diabetes comorbidity in a larger cohort of individuals and with a focus on specific cancer subtypes.

“Lessons from Medicare’s Demonstration Projects on Disease Management, Care Coordination, and Value-Based Payment” *Congressional Budget Office. Issue Brief.* January 2012.







**Effects on Spending and Quality of Care**

The Heart Bypass demonstration was the only value based payment demonstration that yielded significant savings for the Medicare program. Bundled payments reduced Medicare’s expenditures for heart bypass surgeries by about 10 percent, and there were no apparent adverse effects on patients’ outcomes. By contrast, the PGP demonstration had little or no net effect on Medicare spending, after accounting for the bonuses paid, and the Premier demonstration had no net effect on Medicare spending. The evaluators reported that those two demonstrations slightly improved quality of care based on the measures adopted for those demonstrations. Preliminary results for the Home Health demonstration indicate that it had little or no effect on Medicare spending or quality of care in the first year.

**Background:** While guidelines recommend that children with asthma should receive asthma education, it is not known if education delivered in the home is superior to usual care or the same education delivered elsewhere. The home setting allows educators to reach populations (such as the economically disadvantaged) that may experience barriers to care (such as lack of transportation) within a familiar environment.

**Objectives:** To perform a systematic review on educational interventions for asthma delivered in the home to children, caregivers or both, and to determine the effects of such interventions on asthma-related health outcomes. We also planned to make the education interventions accessible to readers by summarizing the content and components.

Search strategy We searched the Cochrane Airways Group Specialised Register of trials, which includes the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, CINAHL, AMED and PsycINFO, and handsearched respiratory journals and meeting abstracts. We also searched the Education Resources Information Center database (ERIC), reference lists of trials and review articles (last search January 2011).

**Selection criteria:** We included randomised controlled trials of asthma education delivered in the home to children, their caregivers or both. In the first comparison, eligible control groups were provided usual care or the same education delivered outside of the home. For the second comparison, control groups received a less intensive educational intervention delivered in the home.

**Data collection and analysis:** Two authors independently selected the trials, assessed trial quality and extracted the data. We contacted study authors for additional information. We pooled dichotomous data with fixed-effect odds ratio and continuous data with mean difference (MD) using a fixed effect where possible.

**Main results:** A total of 12 studies involving 2342 children were included. Eleven out of 12 trials were conducted in North America, within urban or suburban settings involving vulnerable populations. The studies were overall of good methodological quality. They differed markedly in terms of age, severity of asthma, context and content of the educational intervention leading to substantial clinical heterogeneity.

Due to this clinical heterogeneity, we did not pool results for our primary outcome, the number of patients with exacerbations requiring emergency department (ED) visit. The mean number of exacerbations requiring ED visits per person at six months was not significantly different between the home-based intervention and control groups (N = 2 studies; MD 0.04; 95% confidence interval (CI) -0.20 to 0.27). Only one trial contributed to our other primary outcome, exacerbations requiring a course of oral corticosteroids. Hospital admissions also demonstrated wide variation between trials with significant changes in some trials in both directions. Quality of life improved in both education and control groups over time. A table summarising some of the key components of the education programmes is included in the review.

**Authors’ conclusions:** We found inconsistent evidence for home-based asthma educational interventions compared to standard care, education delivered outside of the home or a less intensive educational intervention delivered at home. Although education remains a key component of managing asthma in children, advocated in numerous guidelines, this review does not contribute further information on the fundamental content and optimum setting for such educational interventions.

Sharma, K. and T. Taylor “Pharmacy Effect on Adherence to Antidiabetic Medications.” *Medical Care* 50(8) (August 2012): 685 - 691

**Background:** There have been a number of studies relating medication adherence to patient characteristics. There is less research on influence of health care providers on patients’ medication-taking behavior.

**Objectives:** To evaluate the pharmacy-level effect on medication adherence for patients receiving antidiabetic medications.

**Research Design:** This was a hypothesis-driven retrospective study using cross-sectional design and insurance claims data. The main analytical interest was the pharmacy-level effect on proportion of days covered as the measure of medication adherence. Multilevel random and mixed-effect models were used to tease out the

pharmacy-level effect on patient outcomes.

**Subjects:** The study population consisted individuals aged 18–64 years,insured under employer-sponsored private health plans.

**Results:** We estimated models with and without covariates. In both models, pharmacy cluster effect was statistically significant (P< 0.001). In the model without covariates, pharmacy cluster effect accounted for 12.8% (95% confidence interval, 12.4%–13.1%) of total variance in adherence, whereas in the model with covariates pharmacies

accounted for 12.1% (95% confidence interval, 11.6%–12.4%) of total variance. Covariates associated significantly with adherence were age, sex, mail order pharmacy, and prescription drug copay.

**Conclusions:** The results suggest significant variation in medication adherence attributable to pharmacy factor, independent of other effects. The underlying reason could be varying level of influence from pharmacies’ efforts to inform or influence patients to take medications in prescribed manners. More research is necessary to

better understand the effect of specific pharmacy characteristics and practice styles differences.

**Conclusion:** Little is known the extent to which provider-level differences are associated with patient-level outcomes. We examined the existence and extent of such effect by pharmacies on medication adherence in antidiabetic medications. The study was based on the assumption that pharmacies vary in terms of their efforts to influence patient behavior and that is reflected in patients’ medication adherence. We found that

there is not only significant variation in patients’ medication adherence by pharmacy, but the pharmacy remains a critical factor even after isolating it from other individual and

pharmacy factors known to influence adherence. More research is necessary to understand what specific pharmacy characteristics and practice style differences are important to improve adherence. The results suggest that pharmacies can be instrumental in implementing guidelines and policies to improve medication adherence among patients with chronic diseases such as diabetes.

Dusheiko, M., et al., “Does better disease management in primary care reduce hospital costs? Evidence from English primary care” *Journal of Health Economics* 30 (2011): 919– 932.

**ABSTRACT**

We apply cross-sectional and panel data methods to a database of 5 million patients in 8000 English general practices to examine whether better primary care management of 10 chronic diseases is associated with reduced hospital costs. We find that only primary care performance in stroke care is associated with lower hospital costs. Our results suggest that the 10% improvement in the general practice quality of stroke care between 2004/5 and 2007/8 reduced 2007/8 hospital expenditure by about £130 million

in England. The cost savings are due mainly to reductions in emergency admissions and outpatient visits, rather than to lower costs for patients treated in hospital or to reductions in elective admissions.

Afifi, A., et al., “Impact of disease management on health care utilization: Evidence from the “Florida: A Healthy State (FAHS)” Medicaid Program. *Preventive Medicine* 44 (2007): 547–553.

**Objective.** To examine the impact of disease management on utilization of selected health care services.

**Method.** Prospective observational population-based study comparing Florida Medicaid patients who elected to participate in disease management (DM, N=15,275) with a usual-care (UC, N=32,034) group who elected not to participate in the program. Patients had at least one of four chronic diseases (diabetes, asthma, congestive heart failure, and hypertension) and all received standard health care. DM participants received

supplementary telephone health counseling by a managed care specialist. The data for this paper were collected between October 2001 and October 2004.

**Results.** Annual rates of inpatient hospital stays, inpatient days, emergency room (ER) visits, and outpatient (OP) visits, during and post intervention, were used as outcomes. Age, race, gender, comorbidities, severity indicators, geographic location and pre-intervention utilization were used as covariates. Compared to UC patients, DM patients had lower adjusted post intervention annualized rates of hospitalizations ranging from 0.07 to 0.38 stays, lower rates of hospital days ranging from 0.40 to 2.54 days, and lower rates of ER visits ranging from 0.10 to 0.91 visits per DM enrollee in all four chronic conditions. Most results were statistically significant at the 5% level, except for hypertension patients, where they were suggestive, though not significant.

**Conclusion.** Disease management is effective in reducing potentially avoidable inpatient hospital stays and ER visits among patients with chronic illness.

Galbreath, A. D., et al., “Assessing the value of disease management: impact of 2 disease management strategies in an underserved asthma population”. *Annals of Allergy, Asthma & Immunology* 101 (2008): 599 – 607.

**Background:** The goal of disease management (DM) is to improve health outcomes and reduce cost through decreasing health care utilization. Although some studies have shown that DM improves asthma outcomes, these interventions have not been examined in a large randomized controlled trial.

**Objective:** To compare the effectiveness of 2 previously successful DM programs with that of traditional care.

**Methods:** Nine hundred two individuals with asthma (429 adults; 473 children) were randomly assigned to telephonic DM, augmented DM (ADM; DM plus in-home visits by a respiratory therapist), or traditional care. Data were collected at enrollment

and at 6 and 12 months. Primary outcomes were time to first asthma-related event, quality of life (QOL), and rates of asthma-related health care utilization. Secondary outcomes included rate of controller medication initiation, number of oral corticosteroid bursts, asthma symptom scores, and number of school days missed.

**Results:** There were no significant differences between groups in time to first asthma-related event or health care utilization. Adult participants in the ADM group had greater improvement in QOL (*P* \_ .04) and a decrease in asthma symptoms (*P* \_ .001)

compared with other groups. Of children not receiving controller medications at enrollment (13%), those in the intervention groups were more likely to have controller medications initiated than the control group (*P* \_ .01). Otherwise, there were no differences in outcomes.

**Conclusions:** Overall, participation in asthma DM did not result in significant differences in utilization or clinical outcomes. The only significant impact was a higher rate of controller medication initiation in children and improvement in asthma symptoms and QOL in adults who received ADM.

Esposito, D., et al., “Impacts of a Disease Management Program for Dually Eligible Beneficiaries.” *Health Care Financing Review* 30(1) (Fall 2008): 27 – 45.

The LifeMasters Supported SelfCare demonstration program provides disease management (DM) services to Florida Medicare beneficiaries who are also enrolled in

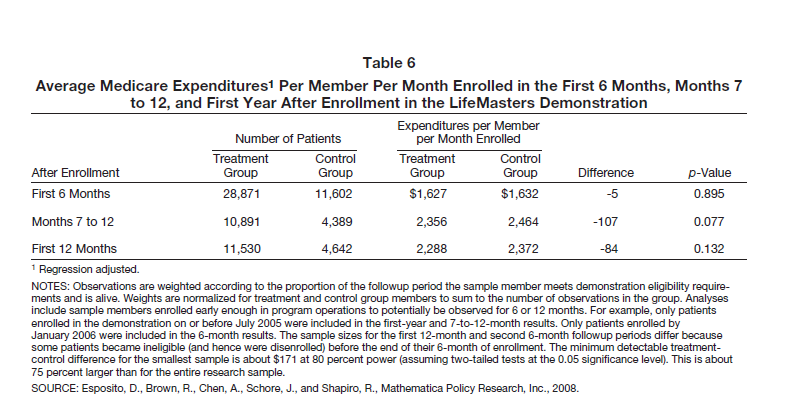
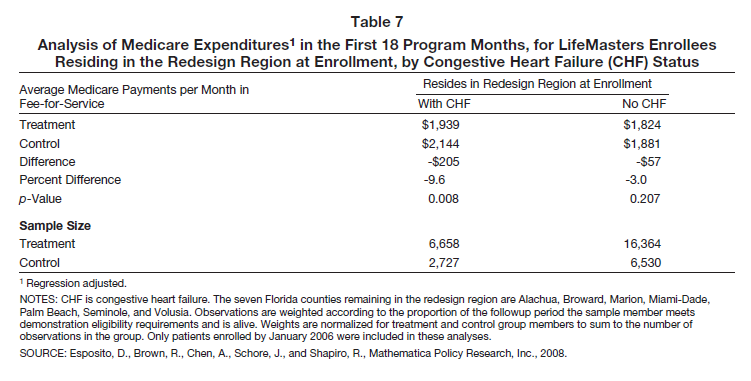
Medicaid and have congestive heart failure (CHF), diabetes, or coronary artery disease

(CAD). The population based program provides primarily telephonic patient education

and monitoring services. Findings from the randomized, intent to treat design over the

first 18 months of operations show virtually no overall impacts on hospital or emergency

room (ER) use, Medicare expenditures, quality of care, or prescription drug use for the 33,000 enrollees. However, for beneficiaries with CHF who resided in high cost South Florida counties, the program reduced Medicare expenditures by 9.6 percent.



Chan, D. C., et al., “Heart failure disease management programs: A cost-effectiveness analysis”. *American Heart Journal* 155 (2008): 332 – 338.

**Background:** Heart failure (HF) disease management programs have shown impressive reductions in hospitalizations and mortality, but in studies limited to short time frames and high-risk patient populations. Current guidelines thus only recommend disease management targeted to high-risk patients with HF.

**Methods:** This study applied a new technique to infer the degree to which clinical trials have targeted patients by risk based on observed rates of hospitalization and death. A Markov model was used to assess the incremental life expectancy and cost of providing disease management for high-risk to low-risk patients. Sensitivity analyses of various long-term scenarios and of reduced effectiveness in low-risk patients were also considered.

**Results:** The incremental cost-effectiveness ratio of extending coverage to all patients was $9700 per life-year gained in the base case. In aggregate, universal coverage almost quadrupled life-years saved as compared to coverage of only the highest quintile of risk. A worst case analysis with simultaneous conservative assumptions yielded an incremental cost effectiveness ratio of $110000 per life-year gained. In a probabilistic sensitivity analysis, 99.74% of possible incremental cost-effectiveness ratios were

< $50000 per life-year gained.

**Conclusions:** Heart failure disease management programs are likely cost-effective in the long-term along the whole spectrum of patient risk. Health gains could be extended by enrolling a broader group of patients with HF in disease management.

Whellan, D. J., et al., “Metaanalysis and review of heart failure disease management randomized controlled clinical trials.” *American Heart Journal* 149 (2005): 722 – 729.

**Background:** The medical community has turned to disease management (DM) to bridge the gap between proven therapies and clinical practice for patients with heart failure (HF). The aim of this study was to assess the effectiveness of DM programs in reducing hospitalization and mortality in patients with HF on the basis of the results of existing trials.

**Methods:** We compared the published results from 19 randomized controlled clinical trials evaluating HF DM programs. A random effects model was used to combine the hazards ratio for all-cause hospitalization across the studies evaluating specific types of HF DM programs.

**Results:** We identified 19 relevant studies, with 5752 enrolled patients, which assessed the benefits of HF DM programs. The overall effect was a significant decrease in all-cause hospitalization for patients with HF. There was significant heterogeneity in the results ( P < .0001).

**Conclusions:** The results of this analysis indicate that HF DM is an intervention that could significantly decrease hospitalization for patients with HF. However, due to differences in the types of strategies and the variety of health care settings in which they were evaluated, further studies of HF DM programs with multiple participating centers are required.

Kazi, D. S., et al., “The Economics of Heart Failure” Heart Failure Clinics 9 (2013): 93–106.

**KEY POINTS**

* The overall annual US medical spending attributed to heart failure is approximately $39 billion.
* Making choices based on the relative efficiency with which therapies improve health is rational, although issues besides rationality often need to be included in decision making.
* Angiotensin-converting enzyme inhibitors, βblockers, aldosterone antagonists, and implantable cardioverter-defibrillators are cost-effective by conventional criteria in patients with systolic heart failure.
* In appropriately selected patients with advanced heart failure, the use of cardiac resynchronization therapy (CRT) devices without defibrillation capabilities (CRT-P) as well as heart transplantation seems to provide good value for money.
* The relative effectiveness and cost-effectiveness of CRT devices with defibrillation capabilities (relative to CRT-P devices) and left ventricular assist devices remain uncertain.

de Bruin, S. R., et al., “Impact of disease management programs on healthcare expenditures for patients with diabetes, depression, heart failure or chronic obstructive pulmonary disease: A systematic review of the literature.” *Health Policy* 101 (2011):105 -121.

**Objective:** Evaluating the impact of disease management programs on healthcare expenditures for patients with diabetes, depression, heart failure or COPD.

**Methods:** Systematic Pubmed search for studies reporting the impact of disease management programs on healthcare expenditures. Included were studies that contained two or more components of Wagner’s chronic care model and were published between January 2007 and December 2009.

**Results:** Thirty-one papers were selected, describing disease management programs for patients with diabetes (n = 14), depression (n = 4), heart failure (n = 8), and COPD (n = 5). Twenty-one studies reported incremental healthcare costs per patient per year, of which 13 showed cost-savings. Incremental costs ranged between −$16,996 and $3305 per patient per year. Substantial variation was found between studies in terms of study design, number and combination of components of disease management programs, interventions within components, and characteristics of economic evaluations.

**Conclusion:** Although it is widely believed that disease management programs reduce healthcare expenditures, the present study shows that evidence for this claim is still inconclusive. Nevertheless disease management programs are increasingly implemented in healthcare systems worldwide. To support well-considered decision-making in this field, well-designed economic evaluations should be stimulated.

“Medicare and the Health Care Delivery System” Medicare Payment Advisory Commission (MedPAC). June 2012

As part of its mandate from the Congress, each June the Commission reports on Medicare payment systems and on issues affecting the Medicare program, including changes in health care delivery and the market for health care services. In this report, we examine several issues central to the beneficiaries’ experience of the Medicare program.

While much of the Commission’s work focuses on providers and their payment incentives, how beneficiaries view the Medicare program and how they make decisions

about their health care are vital to the program’s success.

Aligning the beneficiary, the provider, and the program has the potential to improve health, to improve the experience of health care provided through Medicare, and to control costs for the beneficiary and the taxpayer alike. In the first four chapters of this report we consider:

* The design of the fee-for-service (FFS) Medicare benefit package
* Care coordination for beneficiaries in FFS Medicare with an emphasis on the results of past Medicare care coordination demonstration projects and a review of promising new models.
* Improving care coordination for beneficiaries dually eligible for Medicare and Medicaid, a population that may benefit the most from improved care coordination,
* Risk adjustment for Medicare payments to Medicare Advantage (MA) plans.

McCall, N. and J. Cromwell “Results of the Medicare Health Support Disease-Management Pilot Program.” *The New England Journal Of Medicine* 365(18) (2011): 1704 – 1712.

**Background:** In the Medicare Modernization Act of 2003, Congress required the Centers for Medicare and Medicaid Services to test the commercial disease-management model in the Medicare fee-for-service program.

**Methods:** The Medicare Health Support Pilot Program was a large, randomized study of eight commercial programs for disease management that used nurse-based call centers. We randomly assigned patients with heart failure, diabetes, or both to the intervention or to usual care (control) and compared them with the use of a difference-indifferences method to evaluate the effects of the commercial programs on the quality of clinical care, acute care utilization, and Medicare expenditures for Medicare fee-for-service beneficiaries.

**Results:** The study included 242,417 patients (163,107 in the intervention group and 79,310 in the control group). The eight commercial disease-management programs did not reduce hospital admissions or emergency room visits, as compared with usual care. We observed only 14 significant improvements in process-of-care measures out of 40 comparisons. These modest improvements came at substantial cost to the Medicare program in fees paid to the disease-management companies ($400 million), with no demonstrable savings in Medicare expenditures.

**Conclusions:** In this large study, commercial disease-management programs using nurse-based call centers achieved only modest improvements in quality-of-care measures, with no demonstrable reduction in the utilization of acute care or the costs of care.

Crane, S., et al., “Reducing Utilization by Uninsured Frequent Users of the Emergency Department: Combining Case Management and Drop-in Group Medical Appointments.” Journal of the American Board of Family Medicine 25(2) (March–April 2012):184 – 191.

**Background:** Patients with complex behavioral health and medical problems can have a disproportionate impact on emergency departments.

**Methods:** We identified a cohort of 255 low-income, uninsured patients who had used inpatient or emergency department services more than 6 times in the previous 12 months. Between July 2010 and June 2011 we enrolled 36 of these high-risk patients to participate in a twice-weekly drop-in group medical appointment staffed by an interdisciplinary team of a family physician, behavioral health professional, and nurse case manager. The team provided 705 patient visits in a group setting (a total of

108 group sessions) and 652 case manager phone calls. The average number of clients per drop-in group medical appointment was 6.5.

**Results:** Emergency department use dropped from a rate of 0.58 per patient per month to 0.23 (P <.001), and hospital charges dropped from $1167 per patient per month to $230 (P < .001). Employment status increased from 4 to 14 among the 36 patients enrolled. Total annualized cost of the program was $66,000.

**Conclusions:** Team-based drop-in group medical appointments coupled with case management seem to be a cost-effective model to reduce emergency department visits by some patients with complex behavioral health and medical needs.

Ofman, J. J., et al., “Does Disease Management Improve Clinical and Economic Outcomes in Patients with Chronic Diseases? A Systematic Review”. American Journal of Medicine 117 (2004): 182 – 192.

**PURPOSE:** To assess the clinical and economic effects of disease management in patients with chronic diseases.

**METHODS:** Electronic databases were searched for English language articles from 1987 to 2001. Articles were included if they used a systematic approach to care and evaluated patients with chronic disease, reported objective measurements of the processes or outcomes of care, and employed acceptable experimental or quasi-experimental study designs as defined by the Cochrane Effective Practice and Organization of Care Group.

**RESULTS:** Two reviewers evaluated 16,917 titles and identified 102 studies that met the inclusion criteria. Identified studies represented 11 chronic conditions: depression, diabetes, rheumatoid arthritis, chronic pain, coronary artery disease, asthma, heart failure, back pain, chronic obstructive pulmonary disease, hypertension, and hyperlipidemia. Disease management programs for patients with depression had the highest percentage of comparisons (48% [41/86]) showing substantial improvements

in patient care, whereas programs for patients with chronic obstructive pulmonary disease (9% [2/22]) or chronic pain (8% [1/12]) appeared to be the least effective. Of the outcomes more frequently studied, disease management appeared to improve

patient satisfaction (71% [12/17]), patient adherence (47% [17/36]), and disease control (45% [33/74]) most commonly and cost-related outcomes least frequently (11% - 16%).

**CONCLUSION:** Disease management programs were associated with marked improvements in many different processes and outcomes of care. Few studies demonstrated a notable reduction in costs. Further research is needed to understand how disease management can most effectively improve the quality and cost of care for patients with chronic diseases.

**Coordinated Care**

Schore, J., et al., “Fourth Report to Congress on the Evaluation of the Medicare Coordinated Care Demonstration” *Mathematica Policy Research, Inc.* (March 2011)

**SUMMARY OF FINDINGS**

Overall, the two remaining projects (HQP and Mercy) successfully enrolled 2,965 beneficiaries in the research sample through September 30, 2007, and half were randomized to the treatment group and half to the control group. Mercy’s enrollees were, on average, much sicker than the Medicare fee-for-service population nationwide; HQP’s enrollees were similar to the fee-for-service population nationwide.

Neither program was cost effective overall, but results are promising for high-risk patients. Neither program achieved cost neutrality or net savings for all of its enrollees during the six and a half year period examined for this report (April 2002 through September 2008). However, for a subgroup of enrollees at greater risk of hospitalization and high costs, HQP generated savings for CMS of $397 per beneficiary per month after including the care coordination fee. Mercy’s treatment group had lower Part A and B costs than the control group, but the difference was not statistically significant (-$130, p=0.13) and the average monthly program fee paid over the period ($230) substantially exceeded this estimated savings in 15 Fourth Report to Congress on the Evaluation Mathematica Policy Research of the Medicare Coordinated Care Demonstration traditional Medicare expenditures. To summarize, while HQP generated savings for its high-risk patients, Mercy would have had to dramatically cut its fee or improve its effectiveness to have achieved cost neutrality. This high-risk subgroup, who had CHF, CAD, or COPD and at least one hospitalization in the year prior to enrollment, constitutes 14 percent of all Medicare beneficiaries in fee-for-service, and accounts for a disproportionate 30 percent of total Medicare expenditures in the year after identification.

The programs made limited improvements to the quality of care. Small sample sizes among disease-specific quality of care measures made it difficult to determine whether the programs improved quality of care unless the improvements were large. Among all patients, HQP improved 4 of 12 measures of receipt of preventive services and 1 of 9 measures of preventable adverse outcomes, and Mercy improved one measure of receipt of preventive services. In both programs the treatment group was significantly more likely than the control group to report that a health professional had explained to them how to take their medications properly. There were fewer measurable quality improvements among the high-risk patients, perhaps due to the smaller sample sizes. HQP’s treatment group mortality was 3.3 percentage points lower than its control group’s (p=0.02); Mercy’s treatment group’s mortality was 4.1 percentage points lower than its control group’s (the difference was not statistically significant). Among the high-risk group, the treatment groups had lower mortality rates than the control group, but the differences were not statistically significant, perhaps due to their substantially smaller sample sizes and corresponding lower statistical power than for the full sample.

Patients and providers were highly satisfied with the intervention. Based on earlier results from surveys of patients and providers, the programs were well received by both patients and providers.

Several features of the interventions appear to contribute to HQP’s and Mercy’s ability to reduce hospitalizations for the high-risk patients. The features of HQP and Mercy and two other MCCD programs that reduced hospitalizations were compared to the other seven MCCD programs. Using highly educated and experienced registered nurses to provide the right interventions to the right people appears to be the key to reducing hospitalizations. The successful programs were more likely to provide:

1. Face-to-face care coordinator contact with patients,

2. Face-to-face care coordinator contact with physicians,

3. Evidence-based patient education,

4. Management of care setting transitions,

5. Facilitation of communications across providers, and

6. Medication management.