

# The Value of Nursing Care Coordination—Annotated Bibliography

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## **The Value of Nursing Care Coordination: Annotated Bibliography**

**Allen, J. K., Himmelfarb, C. R., Szanton, S. L., Bone, L., Hill, M. N., & Levine, D. M. (2011). COACH trial: a randomized controlled trial of nurse practitioner community health worker cardiovascular disease risk reduction in urban community health centers: rationale and design. *Contemporary Clinical Trials*, 32(3), 403-411.**

The COACH (Community Outreach and Cardiovascular Health) was a randomized controlled trial evaluating the effectiveness a comprehensive program guided by nurse practitioner (NP)/community health worker (CHW) teams. The primary aim of this program was to improve patients' ability to reach goals as recommended by national guidelines for cardiovascular risk reduction, which included lipids, HgA1c, hypertension, diet, and exercise. Secondary aims included determination the cost effectiveness of the comprehensive program and evaluation of the patient's perception of illness. The trial was based in a federally funded community health center in an urban, under-served area.

The researchers collaborated with a community provider advisory committee to provide culturally competent care and involved those providers in decision-making in creating the teams and encouraging patient compliance. To date, 525 patients have been randomized in one of two groups; the sample in each group had similar characteristics. The comprehensive intervention was based on the NP/CHW team in which the NP performed the initial assessment and developed the plan of care with input from the CHW. Interventions included: 1.) focus on lifestyle modification, counseling, medication, and education; 2.) review of laboratory results and other clinical data; 3.) discussion of treatment plan with educational materials suitable for low-literacy populations, consideration of barriers, and enhancement of the treatment plan; 4.) discussion related to self-adherence strategies, reminder tools, reinforcement of positive changes; 5.) ensuring follow-up; and 6.) referral to CHW for assistance with barriers and reinforcement of interventions and education. The usual care group received their lab results with pamphlets published by AHA. The providers also received copies of the American Hospital Association/American College of Cardiology (AHA/) Guidelines for Secondary Prevention.

Limitations included the predominance of African-American women in this study. This could be a positive incidence, as the results could be more accurately attributed to that population in a medically underserved area, however limited in other settings. Another limitation was physicians

having patients in both groups and physician exposure to the intensive intervention group could have influenced the care of the control group, leading to a Type II error.

At the time of publication, only preliminary data were available and final results are pending. The researchers have thus far concluded that this is potentially powerful way to evaluate a community-invested approach to cardiovascular disease in a medically underserved area. Several studies have shown that nurse-led teams have demonstrated marked improvements in reducing LDL-C, and it is speculated that the addition of CHW improves compliance by creating a link between the indigenous population and the provider.

**Antonelli, R. C., Stille, C. J., & Antonelli, D. M. (2008). Care coordination for children and youth with special health care needs: a descriptive, multisite study of activities, personnel costs, and outcomes. *Pediatrics*, 122(1), e209-e216.**

This prospective, descriptive study of six pediatric practices over an eight-month period was designed to utilize a care coordination measurement tool developed at the University of Massachusetts to record non-billable, non-reimbursable activities by office personnel, including clinical staff. The selection criteria for pediatric practices were strict; six clinics in multiple regions of the country participated in the study. These were selected based on patient population, payment mix, practice characteristics, and commitment to the study. Recorded were 3,855 encounters with 3,172 patients. Cost was a function of time, and the average wage occupational employment and wage data from 2002. The cost for care coordination activities ranged from \$4.39 to \$12.86. Higher costs were associated with physician-centered models. Encounters by RNs of 62% and 33% of encounters by MDs resulted in prevention of more costly care. RN encounters led to 81% prevention of emergency department (ED) visits and 63% prevention of unnecessary office visits. The findings support that having nurses as care coordinators may be a more cost-effective way of managing the care of pediatric patients, as compared to physician-led care coordination.

The descriptive design of the study limits its ability to apply to other settings. The time for care coordination activities may be underestimated in a busy clinic. Despite these limitations, this study provides insight into care coordination performed by various health care professionals and provides compelling evidence of the benefits of having nurses perform in the role of care coordinator.

**Atherly, A., Thorpe, K. E. (2011). Analysis of the treatment effect of Healthways' Medicare health support phase 1 pilot on Medicare costs. *Population Health Management*, 14(1), 23-28.**

This analysis was conducted to evaluate the treatment effect of a randomized controlled trial where Medicare fee-for-service beneficiaries were randomly assigned to either the treatment group of disease management, intensive case management and long-term care management or the control group of usual care. Nurses, dietitians, and other clinical specialists worked with

patients and/or their caregivers to promote adherence to medical plan of care, to empower and educate patients to promote self-management. The intensive case management program targeted individuals at high risk for hospitalization; at any given time, these individuals comprised approximately 20% of the target population. This effort included both basic disease management program elements, such as coordinated care with physicians and other community resources, as well as additional services. Overall, the findings support that a total annual Medicare costs for the participating sample were 15.7% lower in 2007 (\$3240) than for the control group. Participants in the intervention group had lower Medicare expenditures, both overall and within risk class. In the descriptive analysis, mean spending for the intervention group was \$3567 lower than for the control group in 2007. In the regression analysis, total annual Medicare costs were \$3240 lower in 2007 than in the control group, controlling for age, sex, race, and baseline risk. This study shows that significant cost reductions among high-cost, chronically-ill Medicare beneficiaries are possible with care coordination.

**Ayanian, J. (2009). The elusive quest for quality and cost savings in the Medicare Program. *JAMA*, 301, 6, 668-670.**

This editorial highlights the challenges of determining optimal outcomes from care coordination processes. The author discusses care coordination approaches for people with chronic health conditions aimed at improving quality of care and reducing health costs as part of the Medicare Coordinated Care Demonstration project. One common feature among the 15 programs was the use of nurses as care coordinators. The nurses provided health education and outreach to the participants. The Centers for Medicare and Medicaid paid each program an average fee of \$235 per participant per month. The interventions showed only sporadic effects on quality of care, with increased costs in some intervention groups—primarily in patients with more serious chronic disease. Hospitalization rates showed no significant change. The author concluded that these demonstration projects are needed but thus far have not shown a benefit in overall cost savings, calling for additional actions to balance the Medicare budget.

**Bertakis, K. D., & Azari, R. (2011). Patient-centered care is associated with decreased health care utilization. *Journal of the American Board of Family Medicine*, 24(3), 229-239.**

Bertakis and Azari enrolled 509 new patients who were randomized either to primary care or internal medicine clinics staffed by second- and third-year residents. The objective of this study was to measure the amount of primary care utilization in comparison to utilization of specialty care clinics, emergency department visits, hospitalizations, and diagnostic tests, and to observe the differences between IM and family practice MD residents. The authors controlled for health status, health risk, and gender. In addition, they also observed gender differences in rates of health care utilization which were analyzed separately. The providers were 26 family MDs and 71 internal medicine MDs.

Patients underwent a pre-exam interview which was not shared with the MD. Tools used included the Michigan Alcohol Screening test, Medical Outcomes Study Short Form 36, and the Davis Observation Code. Each patient's interaction with the MD was filmed by a unobtrusive camera and rated by observers using Davis observation codes. A 2-phase regression model was used.

The total annual charges for patients with more patient-centered care (PCC) was \$948 compared to \$1435 for patients with less patient-centered care. The only significant factor in determining reduced specialty utilization, including the use of the ED, diagnostics, and hospital admissions, was PCC. A 1% increase in PCC reduced specialty use by 3%, and a higher utilization of PCC was associated with lower than average total health care costs. Gender differences were not significant, with both resulted in increased costs with more PCC. Overall, higher costs were associated with female gender, increasing age, and lower health status.

Costs associated with PCC is not fully understood, but it may be related to better listening by the participants, decreased anxiety, and increased participation and partnership between patients and health care providers. The strengths in this study include its longitudinal nature, control of confounding variables, and direct observation using a known observational tool. The study is limited by the type of providers in this study. The medical residents may not reflect the same practice styles that exist among community physicians. Also, this sample may not reflect the general population. Future research is needed to validate the Davis observational codes and compare this tool with other established tools, such as Dr. Moira Stewart's Measure of Patient Centered Communication (MPCC). Also, more research is needed on whether the cost of PCC is associated with alterations in elective spending or appropriate spending. This study used a tool not validated for this purpose, but in this study it clearly demonstrated the economic value of PCC.

**Bodenheimer, T. (2007). Coordinating care: a perilous journey through the health care system. *New England Journal of Medicine*, 358:1064-1071.**

Continuity of care includes the relationship between a single practitioner and patient extending across time and settings. When continuity is limited, coordination is "constant and essential." Some factors that increase the need for care coordination include patients with more complex health problems, requiring multiple providers who may not communicate with each other. Bodenheimer provides exemplars of uncoordinated care and excerpts from published studies that examined the patient's perspective on poor care coordination.

Coleman's Care Transitions Measure (CTM-3) is one method that considers the patient's perspective on care coordination as part of discharge planning. Provider-patient issues and provider-to-provider uncoordinated care can result in medication errors, adverse events, duplicate diagnostic testing, and preventable miscommunication during transitions of care.

Barriers to continuity in care coordination include increasing responsibility of the primary medical home, uninformed and passive patients, limited time, limited integrated EHR systems, wrong priorities in financing, and lack of patient-centered quality improvement. The author proposes the following changes: transformed primary medical homes with a team lead model (provider and coach, which ideally would be an RN or advanced practice clinician, and possibly a medical assistant) and informed patients; integrated EHR; fixed primary care financing; integrated care systems; and family- and patient-centered quality improvement work. This article certainly provides evidence that supports care coordination but did not fully describe the roles of health care professionals within the various models.

**Boyd, C. M., Reider, L. Frey, K., Scharfstein, D., Leff, B, Wolff, J., Groves, C., Karm, L. Wegwnwe, S., Marsteller, J., & Boulton, C. (2010). The effect of guided care on the perceived quality of health care for multi-morbid older persons: Eighteen-month outcomes from a cluster-randomized controlled trial. *Journal of General Internal Medicine*, 25 (3), 235-242.**

The researchers presented an analysis of patients' perceptions of the quality of the care they received as part a randomized controlled trial (RCT), using guided care as part of the Chronic Care Model in community-residing older adults over the age of 65 and with chronic health conditions. Participants in the RCT were randomized to either the group receiving guided care (GC) or to the control group who received usual care (UC). Guided care incorporates evidenced-based processes and patient communications to improve outcomes for patients with chronic illnesses and complex care needs. Guided care was provided by RNs at the multiple practice sites. Specific interventions, which included care coordination activities, were aimed at enhancing patient decision-making, encouraging self-management, improving functional status, and promoting access to necessary resources.

The multisite intervention recruited RNs with at least three years of experience, strong communication skills, cultural competence, an ability to use flexible approaches in problem-solving, and experience in geriatric and community nursing. The RNs worked with primary care physicians and other health care providers to provide care coordination for a panel of 50-60 high-risk elderly patients.

Face-to-face interviews at baseline and telephone interviews at 18 months were conducted. The Patient Assessment of Chronic Illness Care instrument was used to assess the patients' perception of the quality of care they received. The analysis indicates that 18 months after baseline, the GC group had mean scores indicating a higher quality of care compared to the UC group. The findings of this study support the value of guided care in improving the quality of care for older adults with chronic health conditions.

**Brandt, S., Hartmann, J., & Hehner, S. (2010, October). How to design a successful disease management program. *The McKinsey Quarterly*.**

**Available at [www.mckinseyquarterly.com](http://www.mckinseyquarterly.com)**

Seventy-five percent of all health care spending is devoted to chronic conditions. There is tremendous opportunity to implement programs aimed at reducing health care costs. In the past, disease management programs (DMPs) were not successful in long-term outcomes or cost savings. Some of this can be attributed to low-powered studies and small programs. The authors reviewed DMPs across the globe (Germany, USA, Netherlands, and Japan) and analyzed common characteristics of successful programs. They found that successful programs had five characteristics in common.

Size: Larger programs can benefit from the economy of scale. They can use the data to refine their protocols and programs, ease of provider compliance, and provide adequately powered studies for more reliable results.

Simplicity: Use of uncomplicated care paths, single-provider care coordination.

Patient focus: Focus on patient needs and abilities; encourage regular visits and preventive services; use targeted incentive schemes to increase compliance.

IT transparency: Clear goals, methods, outcomes *prior* to study/program; two-way data analysis with internal review and refinement, and third party review and evaluation.

Incentives: Incentives provided for patient and provider compliance.

The authors also note that it took Germany six years to fully implement its DM Type 2 program, which resulted in 25% reductions in inpatient costs. The administrative costs were \$150 per patient per year (paid to MD) and payments were \$180 per beneficiary.

This article did not specifically implicate the role nurses played in reducing costs, but it does highlight the importance of using some of these principles when designing disease management programs.

**Catalyst Center: Improving Financing of Care for Children and Youth with Special Care Needs. (2010). Care coordination in a statewide system of care: financing models and payment strategies.**

**Available at <http://www.hdwg.org/catalyst/statewidecarecoordination>**

Care coordination described in this paper provides Children and Youth with Special Health Care Needs (CYSHCN) with resources and services to attain good health. Care coordinators are not gatekeepers. This report describes the limited availability of care coordination activities for these patients related to the lack of a consistent model and financing. A possible framework for developing a statewide system of care coordination with cost and financing options is also described.

In a survey of the states, the majority of states used nurses and social workers as care coordinators. Caseloads varied from 100-300 patients, with smaller caseloads involving more complex patient needs handled by nurses. Funding for these activities ranged from outside agencies such as foundations, Maternal Child Health block grants, and Medicaid. Inclusion criteria were generally Title V criteria. Some states included income limits, SSI income, or medical complexity in identifying children as CYSHCN. Some states allow providers a yearly fee for care coordination. For example, Michigan allows \$300 per year or \$1200 per year per patient for more complex needs.

Most states reported that less than 10% of CYSHCN received care coordination services; it is estimated that many more need those services. By using the National Survey of Children with Special Health Care Needs, an estimated number of children who qualified as CYSHCN can be used to estimate how many children might require care coordination. For example, in 2005-2006, 47% of families reported that they either used or required care coordination services. Therefore, a state could plan on slightly less than half of CYSHCN needing care coordination services. Those patients who required more services were more likely to be male, African-American or Hispanic, have multiple health conditions, chronic pain, anxiety/depression, dysphagia, difficulty with coordination, learning, understanding, communication, behavior and attention problems, be uninsured, live in poverty, miss more school days than most, have more ED or MD visits, and receiving Part C early intervention services.

In developing a model of statewide care coordination for CYSHCN, it was assumed that the care coordinator responded to the needs of the patient and family (rather than the organization) across systems of care and serve any CYSHCN, rather than be diagnosis-focused. This included mental health needs.

Cost was estimated by calculating the number of CYSHCN by using the NS-CSHCN, determining the caseload per FTE per care coordinator per year, calculating the salary per FTE care coordinator per year, and by considering the skill mix of the coordination team and setting. Broad access to care coordination services has potential to ensure the model's success. Few models utilize nurses exclusively but rather place them in teams in which nurses serve the more medically complex patients or those in crisis.

**Coleman, E. (2006). The care transitions intervention: Results if a randomized controlled trial. *Archives Internal Medicine*, 166, 1822-1828.**

This study examined the effects of care transitions on 30-day re-hospitalizations for community-dwelling adults age 65 and older. Advanced practice nurses were primarily utilized to conduct interventions consisting of "transition coaching" and improving patients' self-care skills and knowledge. Home visits were conducted 48-72 hours post-hospitalization, with three phone follow-ups during the 28 days after hospitalization. The total cost of transitional care interventions was \$70,980, resulting in annual cost-savings of more than \$295, 000 for the entire

group. Patients reported increased self-management and confidence with respect to care requirements.

**Craig C, Eby D, Whittington J. (2011). White paper: *Care Coordination Model: Better Care at Lower Cost for People with Multiple Health and Social Needs*. Cambridge, Massachusetts: Institute for Healthcare Improvement. Available on [www.IHI.org](http://www.IHI.org)**

This is a white paper on care coordination from the Institute for Healthcare Improvement. The white paper demonstrates various care coordination models where nurses are used to lead care coordination at two IHI Triple Aim Sites and community-based programs. It is very useful for purposes of defining and demonstrating the benefits of care coordination and nurses' role.

*SouthCentral Foundation, Anchorage, AK*

Population served: Alaska Native people

Care coordinator skill set: Nurse with support from case management; behaviorist, elder worker, others

Services offered: Integrated team including MD, MAs, behaviorist, full-time nurse care coordinator, administrative assistant, and ancillary staff

*CareOregon, Portland, OR*

Population served: High-risk Medicaid and dual eligible members

Care coordinator skill set: Case management teams comprising registered nurse, behaviorist, and health care guide (depending on the nature of the member's challenges, one staff person will be primary); Caseloads range from 50 to 85 members at any given time

Services offered: Service coordination between direct care providers

- Ensuring appropriate and timely access to services, pharmaceuticals, and durable medical equipment
- Teaching, coaching, and skill building related to chronic and acute health conditions, including mental health
- Promoting an optimal primary care home relationship

*Central City Concern's Recuperative Care Program, Portland, OR*

Population served: Old Town Clinic, a Federally Qualified Health Center (FQHC)

Care Coordinator skill set: Care Coordinator is a Master of Social Work (MSW) or Emergency Medical Technician (EMT) working within an integrated team that includes a physician, housing specialist, logistics coordinator, and a full-time volunteer; caseload ratio: 1:25

Services offered: Housing, about 30-day respite with connection to permanent supportive housing

Funded by: Local hospitals, CareOregon, and City of Portland Housing Bureau

*Pathways to Housing Philadelphia, PA*

Population served: low income

Care coordinator skill set: Registered Nurse is the care coordinator working within a multidisciplinary Assertive Community Treatment (ACT) team; Caseload ratio: 1:10

Services offered: On-site physician from local university hospital; permanent supportive housing

Funded by: ACT, Medicaid, physician, grants

*BronxWorks Homeless Outreach Team, Bronx, New York*

Population served: homeless

Care coordinator skill set: Licensed social worker; caseload 1:15

Services offered: Finding Federally Qualified Health Centers (FQHCs) in the community; Transitional and permanent supportive housing

Funded by: local Department of Homeless Services

*Hospital to Home, New York, New York*

Care coordinator skill set: community health worker or bachelor of social work; Caseload ratio: 1:25

Services offered: Integrated primary care team; link to transitional and permanent supportive housing

Funded by: New York State Department of Health grant

**Farmer, J.E., Clark, M.J, Drewel, E.H., Swenson, T.M. & Ge, B. (2010) Consultative care coordination through the medical home for CSHCN: A randomized controlled trial. *Maternal Child Health Journal*, 15: 1110-1118**

This randomized controlled trial randomly assigned 100 children and their families to either an intervention group receiving care coordination as part of the medical home or to a usual care group for six months, and then switched the groups to provide the control group with the intervention for the second six months of the project. All children were part of a Medicaid managed care plan and had at least one health condition lasting at least one year. A care team was put in place that included a physician and staff member (usually a nurse) and a family support specialist. One nurse practitioner, two nurses, and a social worker provided families with support, care coordination, written care plans and resources. The analysis consisted of between-group analyses, replication analyses, and within-subject analyses. The findings demonstrated that care coordination led to better overall child health ratings and a trend to improved child functional status. In addition, parents and the staff were satisfied with the program. Care was better integrated and more comprehensive, with timely, preventive care. The plan of care and support from the care coordinator were valued by the mothers, and physicians valued the assistance for solving problems that these children and families with complex conditions may have had.

**Gerontological Society of America. (2010). Diffusing care coordination models: translating research into policy and practice Scientific summit: summit summary and discussion points. Available at <http://www.geron.org/Diffusing%20CC%20Models-Summit%20Summary.pdf>**

Vulnerable populations such as older adults with complex health conditions are at risk for poor health outcomes when care is delivered by multiple providers in a fragmented system. Medicare beneficiaries with chronic conditions see an average of 13 physicians annually, further supporting the need for effective care coordination initiatives. Problems associated with inefficient care coordination include duplicated services and tests, inappropriate or conflicting care plans, medication errors, patient lack of knowledge of symptoms requiring follow-up, patient/family distress, and increased health care costs. The ideal care coordination model would reduce unnecessary health care utilization and increase quality of care and quality of life for older adults.

The goals of the summit included a review of the literature of evidence-based models of care coordination, identification of barriers to implementation, and identification of strategies to promote care coordination in the public policy arena. The summit participants divided the 15 evidence-based models they reviewed into either primary care or community-based models. Primary care models include GRACE, PACE, Veterans Affairs HBPC, and Guided Care. Community-based models are based in the acute or agency setting and include transitional care and nurse-physician teams for nursing home residents. The limitations in the review of evidence included the small number of studies related to the models and the short duration of those studies.

Summit participants identified four processes that were related to the most positive health outcomes. These included: 1.) initial comprehensive assessment of patient and family circumstances; 2.) comprehensive plan of care; 3.) designation of lead communicator and coordinator; and 4.) promotion of patient/family active engagement in care.

Macro-system barriers to care coordination include the following: 1.) misalignment of cost and savings; 2.) optional supplemental services funded by Medicaid at risk for budget cuts; 3.) Medicare too focused on acute conditions with no inflexible payment structure; 4.) current payment rewards illness rather than prevention; and 5.) consumer confusion regarding care coordination as inflexible and prescriptive.

Micro-system barriers include the following: 1.) information gaps regarding model population and staffing requirements; 2.) training burden; 3.) resistance to teams in favor of autonomy; 4.) little attention to outcomes other than patient-related outcomes; 5.) financial disincentives; 6.) poor alignment with local health systems; 7.) lack of integrated health systems; and 8.) lack of accountability for transitions.

Recommendations as the result of this summit include: 1.) Strengthen the evidence by conducting studies; 2.) Facilitate access to care coordination models and evidence (The National Transitions of Care Coalition has a working electronic library of literature and tools for care coordination at <http://www.ntocc.org>); 3.) Develop competencies around care coordination among physicians, nurses, and other providers; 4.) Identify regulation barriers to care coordination; 5.) Seek increased flexibility within state Medicaid programs; and 6.) Use a “bottom up” approach by educating consumers and continually re-evaluating care coordination programs to ensure that recipient needs are met.

**Gordon, J. B., Colby, H. H., Bartelt, T., Jablonski, D., Krauthoefer, M., & Havens, P. (2007). A tertiary care-primary care partnership model for medically complex and fragile children and youth with special health care needs. *Pediatric and Adolescent Medicine*, 161 (10), 937-944.**

The authors used three years of longitudinal data to examine the care of 230 children in fragile health from complex illnesses who were enrolled in a special program for Children and Youth with Special Health Care Needs (CYSHCN). The goal of the program was to improve inpatient and outpatient care coordination. Pediatric nurse case managers were single points of contact for the families and providers. These nurses created care plans, communicated with families and providers, and advocated for children and their families in outside health care systems, occasionally made home or school visits as needed. The study measured resource utilization, charges, and payments. Historically, CYSHCN have higher health care costs secondary to needing more services than healthy children, but in this study the results showed reduction in hospitalizations and number of hospital days, tertiary center costs, charges, and payments. Total costs for care of the participants were reduced by the special needs care coordination program. Although the study findings are not able to be generalized for other populations, they provide preliminary evidence for future studies and support the need for similar programs aimed at improving health outcomes while reducing health care costs for medically complex and fragile CYSHCN.

**Grumbach, K., Bodenheimer, T., & Grundy, P. (2009). The outcomes of implementing patient-centered medical home interventions: A review of the evidence on quality, access and costs from recent prospective evaluation studies. San Francisco: UCSF Center for Excellence in Primary Care. Available at: [www.pcpcc.net](http://www.pcpcc.net)**

This review of multiple site studies related to the Primary Care Medical Home (PCMH) examined diverse settings and patient populations, including pediatrics and the elderly (SCHIP, Medicaid, and Medicare). A general conclusion was that the PCMH model provides an excellent return on investment, resulting in improved quality of care, patient experience, care coordination, and access. The primary cost saving benefits were realized in reduction of unnecessary emergency department visits and hospitalizations, especially for patients with complex chronic health conditions. Some specific approaches were team-based care (nurse coordinator or

nurse/primary care MD) and outreach efforts which resulted in improved quality and overall cost reductions. The review did not provide specific role definitions or cost measures for the care coordinator.

**Iritani, K. (2011). Medicaid and CHIP: Reports for monitoring children's health care services need improvement. Washington, D.C.: Government Accountability Office.**

This is a summary of the Government Accountability Offices's (GAO) report regarding children receiving Medicaid or the Children's Health Insurance Program (CHIP). They are interested in patterns of utilization and access between programs that are fee-for-service or managed care. The Children's Health Insurance Program Reauthorization Act of 2009 required that the GAO report on the extent to which children receive care coordination and have access to appropriate networks of care, methods of care coordination among the states, and the extent of compliance for required documentation of services. The GAO found their analysis impeded by missing data and misinterpreted data but believe that lack of care coordination and appropriate access is a problem for America's children who receive these services.

The National Survey of Children's Health (NSCH) revealed that out of 45% of children with care coordination needs, 37% of children did *not* receive them. The Medical Expenditure Panel Survey (MEPS) revealed that children in these programs had more difficulty accessing services and specialists. The report recommended that the Administrator of CMS be directed to establish a plan and timeline to ensure that the CMS 416 and CHIP annual reports are submitted and correct.

**Katon, W.J., Lin, E. H., Von Korff, M., Ciechanowski, P., Ludman, E.J., Young, B., Peterson, D., Rutter, C.M., McGregor, M.S.M. and McCulloch, D. (2010). Collaborative care for patients with depression and chronic illnesses. *New England Journal of Medicine*, 363(27), 2611-2620.**

This study was a single-blind, randomized, controlled trial in 14 primary care settings, which involved 214 patients with poorly controlled diabetes, coronary heart disease, and/or depression. Patients in the intervention group were medically supervised by primary care MDs in collaboration with a nurse who provided guideline-based collaborative care management. The intervention was aimed at reducing levels of glycated hemoglobin, low density lipoprotein (LDL) cholesterol, systolic blood pressure, and scores on the symptom checklist (SCL 20) for depression at baseline, 6 and 12 months . The RNs were employed part time to implement the intervention and specially trained in depression management, behavioral strategies, and symptoms management for diabetes, lipid control, and blood pressure. The intervention combined support for self-care with pharmacological care. Patients worked with the MD and nurse on the teams. Nurses monitored the patients in the primary care clinic at 2-3 week intervals over the course of the year-long trial. Once targeted levels of health outcomes were reached, a maintenance plan was instituted, followed by telephone contact every 4 weeks to monitor

adherence. If disease control worsened, the patients were brought back to the clinic for protocol-based regimens.

Overall outcomes demonstrated greater improvements in the intervention group in hemoglobin A1C, LDL, systolic blood pressure and SCL-20 depression scores. Only the depression scores were statistically significant ( $p=0.001$ ). However, intervention patients also reported better quality of life ( $p=.001$ ) and greater satisfaction with their chronic disease care ( $p=.001$ ).

**Kligler, B., Homel, P., Harrison, L. B., Levenson, H. D., Kenney, J. B., and Merrell, W. (2011). Cost savings in inpatient oncology through an integrative medicine approach. *American Journal of Managed Care*, 17(12), 779-784**

The purpose of this pilot study was to evaluate the impact of an integrative intervention—yoga, holistic nursing, and a healing environment in the inpatient setting. Several elements of care coordination contributed to cost-savings determined by the study. The following staff contributed to the positive outcomes:

- Holistic nurse training for the entire nursing staff of the oncology floor. These nurses were trained to provide relaxation therapies, including breath work, healing touch skills, and imagery and visualization techniques, specifically to be used to address symptoms of pain, anxiety, insomnia, and nausea. Aromatherapy was with hand massage and was used to address common inpatient complaints including insomnia and anxiety.
- A patient navigator that facilitated the coordination of care and visited the patients twice daily. This full-time staff position, Monday through Friday, fully integrated with nursing functions on the unit; the navigator typically has either a social work or a health education background.
- Yoga therapists on the unit to work with patients using breathing and yoga techniques.

The researchers were able to demonstrate a significant decrease in medication costs in the intervention group compared with controls, in the order of \$469 per patient. Although this decrease may seem modest in light of the overall costs of a given hospital stay, if they extrapolate this savings of approximately \$156 per patient per day to a total of 6264 patient days per year (24 beds  $\times$  261 days; services are not available on weekends), the total savings to the hospital would be \$977,184 annually.

**Laughlin, C. B. and Beisel, M. (2010). Evolution of the chronic care role of the registered nurse in primary care. *Nursing Economics*, 28 (6), 1, 409-414.**

This paper describes a pilot project to increase the functionality of nurses who are employed in ambulatory care practices. The authors note that the usual practice of RNs in primary care settings is limited to telephone triage, patient education, technical duties such as infusion and

medication administration, and visits with patients incident to physicians' plans of care. The value of care coordination activities and contributions of RNs in these settings are not well articulated or understood. The pilot studies being reported in this paper describe strategies to expand and improve the role of RNs in relation to ambulatory patients with chronic health problems. Current reimbursement mechanisms of capitation and fee-for-service do not provide reimbursement for care coordination services. Capitation rewards minimizing services and fee-for-service rewards face to face encounters with providers (NPs, MDs). Principles of the patient-centered medical home call for "coordinated care, integrated across all elements of the health care system facilitated by information technology" and "enhanced access to care including new options of communication" among other things that suggest a direct need for care coordination services. The authors also note that prior to piloting new RN roles, the Chronic Care Model (Robert Wood Johnson Foundation) guided the care system in the practice. Teams worked to maximize each member's scope of practice, but RNs continued to focus on inbound calls and other routine work.

Special funding enabled a pilot project to expand RNs' role in diabetes care. Additional staffing was provided four hours per week to allow the RN to intervene with high-risk diabetic patients. Specifically, these patients were on a registry for those not meeting goals for diabetes self-management such as not achieving a hemoglobin A1C less than 7% or not having LDL cholesterol less than 100mg/dl. RNs assessed patient self-management goals, compliance with medications, barriers to care such as finances and transportation, and coping issues. Protocols were developed to allow the RNs to increase statins and oral hypoglycemic agents. A six month trial was accomplished with care for 23 patients, primarily with interventions via telephone cold call contacts. The nursing intervention group was compared to usual care. Small sample size precluded statistical analysis, but descriptive data demonstrated some improved outcomes in statin use, foot exam, blood pressure control, and eye exam.

Pilot #1 demonstrated the need to separate the RNs from distractions in the office to allow focus on proactive functions. Lessons learned included the following:

- Cold calls are difficult. The RN role with patients was facilitated when the MD introduced the nurse as a member of the team at the time of the visit.
- Blocks of time with additional coverage were inadequate to allow the RN access to patients during office visits.
- Initial assessment is time intensive but necessary to develop the plan of care.
- High-risk patients are complex and time intensive.
- Six months is a short time to evaluate cost and clinical outcomes.
- Coordination work was very gratifying to the nurses.

Pilot # 2 took place in an academic health center that was seeking designation as a patient-centered medical home. The RN role was revised to include patient education, care coordination, self-management support, and assessment and monitoring as needed. MDs referred patients to

the RNs who had overdue tests, needed health education, assistance with developing self-management goals and coaching and support to make lifestyle changes. Care was shifted from reactive to proactive in nature. The test RNs received education on coaching and empowerment of patients with chronic diseases. Two 4-hour sessions were conducted to educate the RNs about the new role. The RN and MD selected moderately complex patients who were thought to be in need of additional assistance. Coaching was done with face to face visits or telephone calls. Interactions were scheduled and planned with the patients. No results of this pilot were reported but it does demonstrate the evolution of the RN role in care coordination.

Pilot #3 focused on telephone outreach to reconnect patients to their medical home post hospital discharge, improve care coordination, and assess gaps in knowledge, skills, and resources to manage at home. Care coordinators documented patients' activities on the EHR. The most frequent activities were medication management (89%), self-management goal setting (63%), referral to primary care provider (51%), and care coordination among providers or services (20%). These findings suggested that patients are frequently discharged from hospitals without adequate medication knowledge or financial access to medications, having inadequate caregiver, and without clear instructions about follow-up appointments at time of discharge. The effects of these new models suggest potential for cost savings, but no cost data are presented in this article.

These studies point to the need to educate RNs for care coordination roles that require specific types of coaching. This education might be suggested as an addition to the Baccalaureate curriculum in our implications section for the position paper. The studies also suggest that RNs need dedicated time for coordination of care activities, and that medication management is a major need for transition to home from hospital. The differences in scope of practice for the RN generalist versus the APRN specialist are evident when comparing the activities and outcomes related to Naylor et al. (1999) and the ACO report and Laughlin pilot studies. Because APRNs can direct management activities, it appears easier to cost out their coordination activities than for practice based RNs.

**Leccese, C. (2011). Adverse drug events raise ED costs, hospitalizations. Available at <http://www.healthleadersmedia.com/content/LED-263138/Adverse-Drug-Events-Raise-ED-Costs-Hospitalizations.html>**

This article references an article published in the *Annals of Emergency Medicine* that posits that emergency department (ED) nurses may impact the increased length of stay and hospitalization costs associated with patients that come in to the ED for adverse drug events. The tool can be used while the patient is in triage and can potentially impact the \$5.6 million in hospital costs annually. This article was not useful for defining *care coordination*.

**Marek, K., Adams, S., Stetzer, F., Popejoy, L., & Rantz, M. (2010). The relationship of community based nurse care coordination to costs in the Medicare and Medicaid programs. *Research in Nursing and Health*, 33(235-242).**

This useful article demonstrated that through nurse care coordination, Medicare costs were decreased in geriatric patient population in a community-based long-term care program. Total Medicare costs savings were \$686 per patient in a 12-month period. Medicaid costs increased \$203 per patient in a 12-month period. The nurse care coordinators followed patients across all care settings.

**Moore, K. D. & Coddington, D. C. (2011). ACO Case Study: Catholic medical partners. Buffalo, NY: American Hospital Association & McManis Consulting.**

Catholic Medical Partners (CMP) is a non-profit independent practice association (IPA) serving western New York. It is the largest IPA in the Buffalo area and is notable as an organization that is relatively well prepared for population health management using value-based reimbursement. CMP were selected as a case study by the American Hospital Association for review because there is: 1.) a cooperative model with mutual investment between multiple private physician groups; and 2.) considerable development of the infrastructure needed to manage the health of defined populations. The key to this model is linkages among the entities by information technology and use of clinical guidelines for specific chronic conditions. The three health insurance plans in western New York provided some of the financial support for this integration by establishing disease-specific registry reporting, Electronic Health Records (EHR) at the practice level, care coordination and disease management, specialty specific quality improvement programs, and other initiatives to engage MDs in population health. The program included three phases—building of the infrastructure, clinical integration using EHR, and initiation of the care coordination program in 2008. This program was funded with \$3 million per year. It is thought that this work is the foundation for a patient-centered medical home.

The care coordinators are usually RNs employed in physician practices. The care coordinator activities are paid from the clinical integration program funds. Care coordinators are responsible for orienting people to the principles of care coordination and for proactive patient care within the practice setting. One FTE care coordinator is required for every 350 patients with a chronic disease; there are currently 164 CC in 86 of the practices, which includes 13 specialty and 73 primary care sites. Roles of the care coordinator have evolved over time and now include the following activities:

- serve as a point of contact for the practice, which increases the communication flow about patients among the participating practices
- redesign work flow to improve patient communications

- assist patients with transitions from hospital to home to reduce likelihood of re-admissions with a home visit within 24 hours of discharge and a follow-up visit with the primary care provider within a week

Other types of care coordination involve pharmacy services to enhance medication usage and improve physician management of medications for chronic diseases. There are specific disease management initiatives for congestive heart failure, coronary heart disease, asthma, high-risk pregnancies, diabetes, chronic lung disease, and pediatric obesity. These programs involve the whole team of providers and the care coordinator.

#### Outcomes and cost issues:

- Infrastructure and key elements of leadership are in place
- Data documenting improvements in patient outcomes and quality of care are just beginning to emerge
- Health insurance plans are supporting the care coordination program using RNs
- CMP supports the implantation and cost of using EHR

RNs are the care coordinators and central to the success of care coordination activities, although their role is minimized in the report. RNs function within the purview of the Medical Home model. The cost of care coordination is supported by a funding mechanism outside the practice—in this case, health insurance companies. Consequently, it is unclear if the CMP would use this model if the RN costs were part of the practice overhead. This situation reflects the traditional barriers to expanding the scope of practice of the RN in primary care practices.

**Naylor, M. D., Brooten, D., Campbell, R., Jacobsen, B.S., Mezey, M. D., Pauly, M. V. & Schwartz, J. S. (1999). Comprehensive discharge planning and home follow-up of hospitalized elders: A randomized trial. *JAMA*, 281 (7), 613-620.**

This is the first of the Naylor et al. publications detailing the advantages of using APRN to assist the elderly who are at risk for readmission in transitioning from hospital to home. It is a well-designed and executed randomized clinical trial with measurement up to 24 weeks after discharge. The outcomes demonstrated reduced readmission rates, time to readmission, and decreased costs of care.

Care coordination activities: Geriatric APRNs at the Master's level with a mean of 6.5 years of clinical experience in hospitals or home care of older adults provided the care coordination activities for elderly patients with chronic disease conditions, including: congestive heart failure, angina, myocardial infarction, respiratory tract infections, coronary artery bypass, cardiac valve replacement, bowel surgery, and orthopedic procedures of lower extremities. The APRNs visited patients in the hospital every 48 hours and at least within 48 hours and 7-10 days post discharge. Additional visits were based on patient need. The APRNs did physical examinations, environmental assessments, and targeted the caregiver and patients' abilities to manage health

problems. Specific focus was on medication management, symptom management, diet, activity, sleep, medical follow-up and emotional status.

Outcome measures and cost data: APRN visits in the hospital replaced traditional discharge planning and therefore their cost is not included in the study. The cost of APRN visits post discharge was estimated by applying Medicare reimbursement rates, which are not a true reflection of actual cost—but a good proxy. Visiting nurse costs were augmented by 20% to reflect the higher level of care delivered by MS APRNs. Reductions in readmission for the intervention group as compared to the control demonstrated significant cost savings. At 24 weeks, the intervention group experienced 270 days of hospitalization, versus 760 in the control group. Other findings included a reduction in time to readmission for controls versus the intervention group. This finding was also significant at the .001 level. The total and per patient imputed reimbursements for the control group were twice that of the intervention group--\$1,238,928 versus \$642,595—which is significant at the .001 level.

Comments: This is a strong study with excellent control and cost data. Many of the control patients received standard visiting nurse services which are generally by RNs who are BS-prepared generalists. The APRN visitation with gerontological specialists in effect increased the nurse dosage of this intervention in that these nurses have more skills in assessment and disease management than generalist nurses. They are also well positioned to collaborate with other health care providers and suggest new interventions which case studies suggest facilitate more timely interventions. Naylor's work is well respected and cited in multiple venues outside of nursing.

**Naylor, M.D., Brooten, D.A., Campbell, R. L., Maislin, G., McCauley, K. M., & Schwartz, J.S. (2004). Transitional Care of Older Adults Hospitalized with Heart Failure: A Randomized, Controlled Trial. *Journal of the American Geriatrics Society*, 52(5), 675-684.**

Naylor et al. designed a one-year multi-site randomized controlled trial with 239 patients over 65 with heart failure who were discharged from the acute setting. The objective was to measure the effectiveness of APRN-directed intervention strategies on time to first readmission or death, re-hospitalizations due to HF or other comorbid conditions, quality of life, functional status, costs, and satisfaction. Patients enrolled in the study had to be English speaking, alert and oriented, reachable by phone, living within 60 mile radius of admitting hospital. Of the 641 multisite patients who were screened, 37% were enrolled. Three APRNs were educated in the unique needs of elders by a multidisciplinary team of providers. The program provided intense APRN involvement in the acute setting with coordinated discharge planning and post discharge interventions. Phone interviews were conducted by research assistants regarding unscheduled MD visits, hospitalizations, and other measures, including satisfaction and quality of life.

The trial's results found savings of \$4,845 per patient, a significant increase in survival, and fewer readmissions. Intervention patients had fewer hospital days than in the control group. When the program ended after three months, the intervention effect was lessened as the one-year mark approached, suggesting that continued APRN involvement would be needed in this population. Although this program used evidenced-based protocols, the APRNs had flexibility to individualize the care plan and interventions to the needs of the patients and their families. Also, this program excluded those who may have been even more frail and in need of intervention.

**Owens, M. K. (2010). Costs of uncoordinated Care. In P. L. Yong, R. S. Saunders, & L. A. Olsen (Eds.). *The health care imperative: Lowering costs and improving outcomes*. Washington, DC: National Academy Press.**

The author of this chapter highlights the opportunity for cost savings in care coordination. Uncoordinated care clearly accounts for a disproportionate share of costs. In fact, the costs of uncoordinated care averages approximately 30% of total plan costs studied. Based upon multiple analyses, we estimated that an average of 35% of the costs contributed by patients with extremely uncoordinated care should be avoidable with improved care integration, enhanced and targeted interventions, and care coordination between providers. If these estimates were extended to the national level, the savings opportunities are great. Assuming that national health reform efforts aimed at these uncoordinated care patients are developed and phased in over three years (realizing savings at 25, 50, and then 75 percent levels), the average savings in the period 2010-2018 are estimated at \$240.1 billion per year, or an average of 8.8 percent of total U.S. annual health expenditures.

**Peikes, D., Chen, A., Schore, J., & Brown, R. (2009). Effects of care coordination on hospitalization, quality of care, and health care expenditures among Medicare beneficiaries. *JAMA*, 301, 6, 603-618.**

A comprehensive study of 15 programs and effects of care coordination are presented—hospitalizations, monthly Medicare expenditures, patient reports, and care process measures. Factors such as chronic conditions, poor adherence to treatment, lack of knowledge about chronic disease, cost, and complexity of care greatly increase for Medicare populations. Interventions focused on care coordination with RNs providing needs assessment, care planning, and information to improve knowledge and behavior. RNs made contact with clients by phone (one to two times per month), and occasionally in person. A standardized curriculum was used for patient education. RN caseloads were 40-70 patients, with average cost of \$235 (from CMS), actual cost average was \$164. Outcome measures showed no decrease in regular Medicare expenses, and some increases. Only one program had decreased hospitalizations, and there was no overall improvement in patient behavior. Benefits were realized in patient satisfaction with some aspects of care. Study concluded that care coordination did not yield significant decreases in Medicare expenditures for chronic illness.

**Rantz, M., Phillips, L., Aud, M., Popejoy, L., Dorman-Marek, K., Hicks, L., Zaniletti, I., and Miller, S.J. (2011). Evaluation of aging in place model with home care services and registered nurse care coordination in senior housing. *Nursing Outlook*, 59, 37-46.**

Rantz et al. have developed a model of RN care coordination centered around maintaining independence for elders. The Missouri University Sinclair School of Nursing (SSON) developed this model to combine the best of community health with intensive RN care coordination. They proposed a pilot project and a change in legislation to accommodate the project. The SSON formed Sinclair Home Care through a CMS grant to provide home care services for the two sites selected for the Aging in Place model. In fact, one of the sites (AIP 1) was specifically built for the project and was envisioned to provide care through the end of life. The other site (AIP 2) incorporates a SNF, assisted living facility, and special dementia and independent living units. Deterioration in those residents requires a transfer for higher levels of care. Services offered include basic care such as vital signs, medication checks or reconciliations, triage of minor health problems and an RN on call 24/7. Rantz et al. used the Geriatric Depression scale, MMSE, MDS, RUGS III quarterly, and a fall risk assessment to gauge mental and physical health status. Sixty-six (66) residents of AIP 1 and 95 residents of AIP 2 were enrolled. Seventy-four percent of the participants were women.

The combined care and housing cost for residents who qualified for nursing home placement but chose to remain in the community was never greater than the cost of a nursing home facility. In fact, it was significantly less. If comparisons were made to assisted living costs, the residents in AIP 1 had higher than average costs, partly related to the commitment through the end of life. Also, the SSON has been able to involve other disciplines, such as information technology and engineering, in this project as well, as using it as a clinical site for nursing students and medical students. They have generated more than \$7.5 million dollars in grants for research and innovation.

**Robles, L., Slogoff, M., Ladwig-Scott, E., Zank, D., Larson, M. K., Aranha, G., & Shoup, M. (2011). The addition of a nurse practitioner to an inpatient surgical team results in improved use of resources. *Surgery*, 150(4), 711-717.**

A retrospective study of 826 patient records demonstrated that the addition of an NP improves patient outcomes and reduces emergency room visits. The Department of Surgery at Loyola hired an NP to help with discharge planning and outpatient visits for patients in the colorectal and surgical oncology clinics. Because of the resident hour restrictions, the staff noticed more disrupted care coordination and patient concerns. The primary responsibility of the NP was to work with the residents/attending, coordinate the discharge plan, and communicate with patients after discharge through post-operative visits and phone calls. Over 826 patient records were reviewed, 415 records prior to the hiring of the NP and 411 after. The number and substance of telephone contacts was measured, and the components of the discharge plan were assessed. A

64% increase was found in the amount of telephone contact initiated and received by the APRN. There was a significant increase in the use of Home health RNs and rehab therapies. There was also a 52% reduction in ED visits that did not result in admission. (The number of unnecessary ED visits was defined as the number of trips to the ED that did not result in admission to the hospital.) Each ED visit was estimated to cost at least \$800. The number of patients admitted to the hospital was not significantly different between the pre and post hiring of the APRN. This indicates that patients who were seen in the ED and admitted were appropriately referred there.

**Savage, B., Segal, M., & Alexander, D. (2011). The cost of health care infections measured in lives, reputations, and dollars. Barrington, Illinois: General Electric Health care.**

Health care Associated Infections (HAIs) costs between \$35-88 billion annually. These infections have been seen as a random inevitable event associated with health care interventions; however they have recently been identified as preventable, non-reimbursable events by the Centers for Medicare and Medicaid Services (CMS). The federal government has initiated a public-private partnership, Partnership for Patients, which provides financial incentives for improvements in quality of care and reductions in HAIs. These authors describe the range of consequences for HAIs in terms of mortality, quality of life, reputation, and legal issues, and provide a description of future opportunities and examples of successful programs and protocols:

Mortality: HAIs are #7 in the top 10 causes of death; there is a 6% probability of death in the presence of HAI, resulting in more deaths than breast and prostate cancer combined.

Quality of Life: The presence of HAIs results in a longer length of stay (22 days vs. 5 days if no HAI); increases readmission rates (30% vs. 6% if no HAI); long term problems; increased medical costs for patients/families.

Reputation: There is greater institutional concern given the increased transparency with respect to hospital performance resulting in increased demand sensitivity, e.g., the CMS “Hospital Compare” website.

Cost: The cost of HAI is \$35-88 billion of unreimbursed costs, reduced payments and legal costs; each HAI is in essence as tax of \$1100 for each admission. A large study analyzed 1.69 million admissions in 77 hospitals found reductions in overall net payments of \$286 million or \$5018 per patient with HAI.

Reduced payments: CMS is currently spending \$174 billion on HAI. CMS will create a system of direct financial disincentives for HAIs: starting in 2015 hospitals in the lowest quartile with respect to hospital acquired conditions will lose 1% of their overall Medicare reimbursement. CMS will also begin implementation of Medicare hospital Value Based Purchasing (VBP) reward for quality of care in acute myocardial infarctions (AMI), heart failure (HF), pneumonia, HAI, surgical care improvements. Penalties imposed for poor performance will be used to fund those hospitals with good performance. Private payers expected to follow.

Legal fees: HAI accounts for 12.2% total liability costs; 16% of malpractice claims were for HAI, pressure ulcers, or foreign retained objects.

A National Quality Strategy has been implemented with 3 goals: better care, healthy people/communities, and affordable care. The goal is to reduce the number of harmful preventable conditions by 40% by 2013. One clear opportunity involves developing protocols/checklists to improve quality of care. (In Michigan, hospitals reduced blood stream infections by 63% and saved \$175 million and 1500 lives.)

This particular paper uses existing studies to present the picture of HAIs and the opportunities for savings and improved health care. The authors did not mention nurses at all as being critical in attaining these goals. Care coordination was not a part of the paper, but was mentioned briefly as a mechanism for prompt treatment in the community. The costs and savings data were included but were not specific for nurses, although their contribution to the savings can hardly be ignored.

**Shuxteau, J. (Spring 2010). Incentives, coordination key to healthy blue, medical homes. *Health Leaders: Interstudy's Mid-Atlantic Health Plan Analysis*.**

Quarterly reports can be accessed at

<http://hl-isys.com/Products-and-Services/HPDA/Spring/2011/Mid-Atlantic-Spring-2011>

This is an article regarding physicians' incentives for care coordination of patients with chronic conditions: \$200 per patient for creating a care plan and \$100 per patient for follow-up. The article does not discuss care coordination in terms of nursing.

**Sia, C., Tonniges, T. F., Osterhus, E., & Taba, S. (2004). History of the medical home concept. *Pediatrics*, 113 (5), 1473-1478.**

Care coordination is especially important and challenging for children who have complex chronic conditions that may be life-long and require special services. These children are often called "children with special health care needs" (abbreviated as CSHCN) or "children and youth with special health care needs" (CYSHCN). In fact, the concept of *medical home* was developed by the American Academy of Pediatrics (AAP) and the federal Maternal and Child Health Care Bureau (MCHB) with just these children and their families in mind (Sia, Tonniges, Osterhus & Taba, 2007). Two studies are noteworthy that examined the impact of care coordination for CSHCN. See Farmer et al. and Gordon et al., above.

**Wennberg, D. E., Marr, A., Lang, L., O'Malley, S., & Bennett, G. (2010). A randomized trial of a telephone care-management strategy. *New England Journal of Medicine*, 363 (13), 1245-1255.**

This is a report of a large randomized study (N=174,120) to assess the effects of telephone-based care management on cost and resource utilization. Buried in the text is the fact that the health coaches were RNs, LPNs, dietitians, respiratory therapists, and pharmacists. The coaches used person-centric software, developed jointly with the Foundation for Informed Medical Decision-

making, which provided additional information and guidelines. The coaches also provided web links, videos, and print materials to the subjects.

Outcome measures were derived from insurance-claims data; after one year, the health care costs for the enhanced-support group were \$8.48 per person lower than for the usual-support group. This number translates into a cost reduction of 4.4% in overall health care expenditures for the year. The savings in the enhanced-support group were primarily due to reduced inpatient and outpatient services.

This article adds to the support for using care coordination in the medical home models but doesn't add much to the specifics of nursing activities in coordination. It does add some support for the telephone outreach methodology as a potential useful strategy.