As we enter a new and changing health care era, today’s providers have reflected on the challenges of the last decade, and described it as extremely tumultuous given the attempts at restructuring the health care system. However, it is important to recognize that, in the face of change and challenge, opportunities are the greatest.

In this changing environment, there is a need to design organizational delivery systems that produce high-quality health care services with increasing efficiency and cost effectiveness (Counts & Mayolo, 2007). Central to restructuring care delivery is the evolving role of the nurse practitioner (NP) and the integration of the role into the health care workforce. This role is necessitated by the increased volume of elderly and chronically ill patients needing holistic and coordinated care (Bergenson & Dean, 2006; Bodenheimer, MacGregor, & Stothart, 2003).

**Background**

The NP Care Model was designed and introduced to the organizational workforce in a Northern New Jersey Medical Center to efficiently coordinate, manage, and monitor the outcomes of high-risk patients with chronic disease. Economically, chronic disease, most specifically heart failure, is the most costly health care problem, with direct cost for diagnosis and treatment approximately $39.2 billion (Roger et al., 2012). With the impending penalties by the Centers for Medicare & Medicaid Services for patients readmitted for any cause within 30-days, it became imperative for organizations to develop planned discharge services that are well coordinated especially for the management of chronic disease. Health care organizations are focusing on improving performance and patient outcomes, paying particular attention to chronic disease management so as to prevent readmissions, decrease costs, and improve quality of life. A decrease in health care reimbursement can be a threat to most hospitals’ mission of patient care. Financial pressures may stem from reduced insurance reimbursement, capitulation, and changes in public funding. Pressures for innovation due to the increasing numbers of patients, and the aging population with complex chronic disease processes, was the impetus for designing the NP Care Model.

The NP Care Model introduced into this organization is a blend of physician and nursing-
based models where interdependency is recognized. In focusing on patients and their families, the NP role in the care model is aligned with the concept of “clinical concierge” which provides counseling, monitoring, and stewardship activities. The activities of the clinical concierge include coordinating care delivery and aligning health care objectives, clarifying disparate care plans, reviewing and presenting diagnostic treatment options to patients and families, providing education regarding therapeutic alternatives, referral to hospice/palliative care as applicable, assisting in preparing patient and care team for discharge planning and follow-up disposition, monitoring of the electronic medical record through updated information acquired by daily rounds and chart review, and organization of family and team meetings as needed. The advantages NPs provide to the organizational workforce are the criteria and competencies that define their role. The criteria include graduate education, professional certification for practice at an advanced level with prescriptive privileges, and practice that is focused on patients and families. The core competencies include expert guidance and coaching (of patients, families, and other care providers); consultation; research skills (including utilization, evaluation, and conduct); clinical and professional leadership, including competence as a change agent; collaboration with other health care professionals; and ethical decision-making skills (Hamric, Hanson, Tracy, & O’Grady, 2012).

Chronic disease affects individuals and families in profound ways. NPs are successful in providing care to persons with chronic conditions because of their advocacy of patient self-care. The key to self-care by patients with chronic illness is to provide self-management education in conjunction with traditional patient education. Through self-management education, patients are taught how to identify and solve problems and thus develop confidence to carry out new behaviors. In management of chronic disease, partnerships develop between the NP, patients, and family members. Patients who develop daily management skills experience an overall change in behavior and are better able to report symptoms accurately. Through the use of diverse approaches and individualized, interpersonal, and therapeutic interventions, NPs have the skills and resources to partner in managing populations throughout the care continuum.

In concert with the organization’s focus on performance improvement with chronic disease management, the focus of this care model was through a three-pronged approach: (a) reduce 30-day readmissions by 11% over 12 months, (b) decrease cost per case, and (c) enhance quality patient outcomes by improving functional capacity and quality of life through an NP-directed patient education on disease self-management. The impetus to successful program initiation is formulating a clinical question. The clinical question addressed by this care model was: In patients with chronic disease, does a NP-directed management model improve disease self-management and reduce readmissions compared to usual medical management?

**PICO: Population, Intervention, Comparison, Outcome(s)**

The population consisted of 312 adult patients 20 to 89 years of age admitted to the hospital with the diagnosis of heart failure. The intervention included NP-directed patient education on daily weight charting, individualized medication administration schedule and the importance of compliance, diet and nutrition counseling including a four-step approach to managing a low-salt diet, daily exercise, smoking cessation, and the elimination of alcohol. The comparison of interest population was usual chronic disease management. The outcome was to reduce 30-day readmissions by 11%.

**Review of Literature**

Nurse practitioners provide many services for patients that improve the overall course of care in the hospital. NPs provide high-quality, cost-effective care for...
patients in a variety of outpatient and inpatient settings (Geirer, 2000; Griffiths, Edwards, Forbes, Harris, & Ritchie, 2007). Much of the research substantiating the effectiveness of advanced practitioners relative to quality of care, satisfaction of patients’ family members, and length of stay has been done in adult inpatient settings (Bergenson & Dean, 2006). Hiring of advanced practitioners does provide more cost-effective services (American Medical Association, 2003; Cohen, 1993; Counts & Mayolo, 2007). Additional cost savings resulted from development of guidelines to individualize patients’ care (Hollinghurst, Horrocks, Anderson, & Salisbury, 2006; Kleinpell & Gawlinski, 2005). NPs are familiar with patients throughout the continuum of care, and are able to tailor the care and education to meet each patient’s needs (Miller, 1997).

In a randomized control trial, DeWalt and colleagues (2006) compared the efficacy of a heart failure (HF) self-management program designed for patients with low literacy versus usual care. They found a reduced risk of hospitalizations and death in a primary care based HF program for patients with low literacy than those patients not in a HF self-management program.

Kasper and associates (2002) sought to determine whether a multidisciplinary program decreases chronic HF readmissions and mortality over a 6-month period when compared to usual care. The results demonstrated a 6-month multidisciplinary approach can improve important clinical outcomes with equivalence in costs of care when compared to hospitalized high-risk patients.

De la Porte and co-authors (2007) analyzed a randomized control vs. interventional group to determine whether an intensive intervention by a HF clinic reduces the incidence of hospitalization for worsening HF and improves functional status in patients with New York Heart Association (NYHA) class II or IV. Following 1 year of intervention, the number of admissions for worsening HF and/or all-cause deaths in the intervention group was lower than the control group (23 vs. 47, p = 0.001).

Kutzleb and Reiner (2006) conducted a quasi-experimental study comparing a nurse-directed care group (NC) and a medical management routine care (RC) in an outpatient setting to determine if education and follow-up improve disease self-management as measured by quality of life (QOL) and functional capacity. Results of this study showed statistically significant improvement in the NC group in the domains of total QOL (p = 0.000), health and function (p = 0.003), social and economic (p = 0.000), psychological and spiritual (p = 0.000), and family (p = 0.048). Functional capacity in the NC group had a more progressive improvement than the RC group (73% increase vs. 9% increase). The study demonstrated HF participants achieved better outcomes and demonstrated disease self-management, improved QOL, and functional capacity.

Collaboration between physicians and advanced practitioners is a key component of a successful care delivery model (Genet, Brennan, & Ibbotson-Wolff, 1995). Benefits of collaboration include decreased fragmentation of care, increased interaction between the physician and NP, and enhanced roles of the NP in clinical evaluation and decision making. A landmark randomized-control trial (RCT) (Mundinger et al., 2000) showed that in an ambulatory care situation in which patients were randomly assigned to either NPs or physicians, and where NPs had the same authority, responsibilities, productivity, administrative requirements, and patient populations as primary care physicians, patient outcomes were comparable. The results of this RCT firmly positioned nursing in the primary care market and gave credibility to the core competencies of primary care NPs (Mundinger et al., 2000).

Model and Framework

The NP Care Model and framework was designed to address quality, cost-effective chronic disease management. Integration of clear communication between NPs and providers enables optimal patient care to occur while maximizing team function (Hollinghurst et al., 2006). Nurse practitioners in the care model, assume the role of front-line, minute-to-minute information providers in multidisciplinary practices (see Table 1).

The NP Model of Care (see Figure 1) focused on coordination of patient services from acute care to post acute care or to home. It is designed to provide a proactive and innovative response to the changing health care environment. The model’s design incorporates the strengths of both medicine and nursing to appropriately identify the individual needs of each patient. The conceptual elements of assessment, planning, intervention, and evaluation provide the opportunity for care to be timely, comprehensive, and coordinated. The integration of medicine and nursing permits ongoing assessments and evaluations of the therapeutic interventions that target both the subjective and environmental elements essential in the management of acute and chronic disease states. Therapeutic modalities are broadened by the integration of holistic and adjuvant therapies to achieve enhanced compliance and disease self-management. The tenets of this model focus on the coordination of services by the NP to promote interdisciplinary collaboration to effectively meet the needs of each patient. In designing the care model, meeting the needs of the patient, physician staff, and organization were key factors in attaining a successful outcome.
The framework of complementary responsibilities (see Figure 2) was then designed to identify the clinical and administrative strengths of the NP role. Through this dual modality of NP care management, enhancement of physician and organizational services can be achieved. This framework further identified the potential opportunities to be gained by the physician and the organization, including potential revenue generated though the implementation of this care model.

The direct clinical care and administrative components of the framework are central competencies to the NP role. The NP utilizes advanced clinical judgment, expert clinical practice, systems thinking, and accountability in providing evidence-based care at an advanced level. The direct care practice of NPs is further distinguished by characteristics which include consultation on both an intra and interprofessional level; ongoing research-based practice to continue to design a standard of care for a population of patients; leadership on a clinical, professional, and systems basis; and collaboration with all members of the health care team. Consultation, collaboration, and referral are crucial to high-quality direct care, which is a hallmark of the NP’s role.

Table 1. Goals for Integrating the NP Care Model

| 1. Deliver direct care and coordinate the interdisciplinary plan of care for patients. |
| 2. Serve as a consultant in improving care based on expertise in area of specialization (pediatrics, cardiology, surgery, family, and adult-gerontology). |
| 3. Identify learning needs of various populations and contribute to the development of educational programs and resources. |
| 4. Evaluate the impact of changes in clinical practice and formulate recommendations regarding appropriateness and cost effectiveness. |
| 5. Identify and build collaborative relationships with physician care teams. |
| 6. Enhance the delivery of a comprehensive continuum of care for patients, thus enabling the physicians the opportunity to focus on appropriately complex and more highly reimbursed patient scenarios. |

Figure 1. Nurse Practitioner Model of Care

Discharge Destination Plan
- Home with family
- Home with HC, VNS, AL, SNIF/LTAC

Patient
- Self-care education
- Disease management

Interdisciplinary
- CM
- CDMP
- Nutrition
- Social worker
- OT/PT
- Med Coders

Nursing Clinical
- Nursing education

NOTES:
CM = case manager, CDMP = clinical documentation specialists, OT = occupational therapy, PT = physical therapy, Med Coders = medical coders, HC = home care, VNS = visiting nurse service, AL = assisted living, SNIF = sub-acute nursing facility, LTAC = Long term care
A few of the primary goals within the administrative focus of the NP role are to meet benchmarks associated with pay for performance, monitor the increasing incidence of chronic diseases, and focus on chronic disease management and self-care to prevent complications and readmissions. As change agents, NPs are skilled at assessing and reassessing the complex forces that drive the system of health care in order to assist clinicians and providers to master new knowledge and change behavior.

Implementation Methodology

The evidence-based practice model used in this program was based on The Iowa Model (Titler et al., 2001). The Iowa Model is an evidence-based organizational model that incorporates the conduct of research and other forms of evidence such as theories, expert opinion, and case reports to design a program that addresses either a problem-focussed trigger or knowledge-focused trigger to improve outcomes. If change in current practice is warranted, the changes are implemented using a process of planned change. Outcome data are collected and decision points regarding the problem are identified clearly according to organizational priority. The Iowa Model for this program stemmed from a problem-focused trigger of increased 30-day readmission rates for patients with HF. Once this problem was identified as an organizational priority, an evidence-based practice team of advanced practice nurses was formed.

The program employed an evidence-based approach to patient education and disease self-management for patients with HF. The literature suggests patients who participate in an advanced practice nurse-directed patient education to heart failure treatment will experience enhanced patient engagement in disease self-management and fewer 30-day hospital readmissions (Bodenheimer, Wagner, & Grumbach, 2002; Bodenheimer, Lorig, Holman, & Grumbach, 2002; Slater et al., 2008).

The population consisted of 312 patients 20-89 years of age admitted to the hospital with the principal diagnosis of heart failure confirmed by a cardiologist based on echocardiography with evidence of left ventricular systolic dysfunction or diastolic dysfunction.

Exclusion criteria included patients who were not literate in English, patients presenting with HF in the setting of myocardial infarction or unstable angina or in whom failure was not thought to be the primary problem, or for whom HF was a secondary diagnosis in conjunction with chronic comorbidities. Also, patients with illnesses that could compromise survival over the duration of the study (e.g., cancer), those with cognitive impairment, or patients taking mood-altering medications (antipsychotics, antianxiety, and antidepressant agents) were excluded.

The NP Care Model was presented and approved by the institutional review board. Patients who participated in the program were informed of the purpose of the program, that their responses would be kept confidential, and that under no circumstances would their participation or lack of participation influence treatment decisions or jeopardize their care.

The NP Care Model was initially implemented as the Healthy Heart Initiative (HHI). The cost of care for patients with HF is immense with an estimated average cost per 4-day admission of $11,993 (Slater, Phillips, & Woodard, 2008). Heart failure 30-
The day readmission rate for this organization was 26% (national average 15%-22%). Therefore, the challenge for program development was to find cost-effective ways to address the cost associated with HF patient management. The care model was based on comprehensive disease management across the continuum of care with services arranged according to individual client needs (see Figure 1). Nurse practitioners were responsible for accessing and coordinating the multidisciplinary care.

**Setting and Plan of Action**

Once the referral was received, the NP assessed the patient’s understanding of HF and began the education regarding disease self-management, symptom exacerbation, dietary restrictions, menu planning, medication management, daily weights, and smoking cessation. Socioeconomic and family support systems were also assessed and appropriate services were integrated by the NP early in the admission phase. In addition to symptom management, the NP assessed functional capacity using a 6-minute walk test. The patients were classified according to the NYHA classification system as either low risk (NYHA II) or high risk (NYHA III-IV) based on recent ejection fraction through a 2-D echocardiogram and presenting symptoms. Once the comprehensive assessment was completed, the individualized plan of care was developed and then updated on each subsequent contact with the patient and/or family member. Once discharged, the patients were enrolled in the outpatient telephonic program with weekly calls by the NP for the first 30 days, then bi-monthly for the next 30 days, then monthly for the last 30 days. This enabled the NP to evaluate the patient’s ability for disease self-management, understanding of his or her chronic disease, and the ability to identify when a change in condition warrants contact with the primary care provider or HHI team. The program was implemented over a 12-month period from January 2012 through January 2013. The program plan of action included: NP evaluation of the patient’s HF knowledge and initiated individualized patient education within 24-48 hours of admission; non-pharmacologic patient education by the NP included disease self-management and recognition of changes in condition status that would warrant medical attention; baseline 6-minute walk test prior to discharge for functional capacity assessment; coordination of multidisciplinary services to meet identified patient needs; provision of scales to patients on an as-needed basis for daily weight monitoring; and weekly telephone monitoring within 7 days of hospital discharge for those patients discharged to home.

**Results**

**Characteristics of sample.** The HHI statistics by sex and NYHA classification included 57 males and 77 females in NYHA II; and 110 males and 67 females in NYHA III (see Figure 3).

Of the 312 patients discharged to home from the HHI program, 26 patients returned within 30 days of discharge (8% readmission rate). The results were compared to the comparative HF group of 325 patients for 12 months prior to program implementation where 85 patients returned within 30 days of discharge (26% readmission rate) (see Figure 4). Costs were $311,818 for the HHI group compared to $1,019,405 from the usual care group for readmissions within 30-days of discharge. Trending analysis of 60 and 90-day patient readmission rates from the HHI program showed long-term improvement as well when compared to the usual care group. The 60 and 90-day readmission rates for the HHI group were 4% and 3% respectively when compared to the usual care group of 27% and 29%.

**Discussion**

The interventions in this program were directed toward increasing patient engagement and self-management of chronic disease. The HHI program focused on patients with heart failure who were discharged to home and identified as high-risk for early readmissions. A NP coordinated the program and targeted causes of rehospitalization (lifestyle, medication and diet noncompliance, and lack of self-care disease management). The program was initiated for hospitalized patients with
heart failure who were discharged to home, whereas prior studies or programs focused on hospitalized patients with HF but not including post-acute discharge management. Successful management of patients with HF was provided by a NP-led multidisciplinary team in concert with primary care providers or cardiologists. This program also demonstrated patient engagement correlated with reduced 30-day readmissions. The HHI program patients described their most positive changes in overall well-being as related to the ability to self-manage medications and diet which stemmed from the education and follow-up provided by the program team. The physiological changes experienced as a result of pharmacologic and non-pharmacologic regimens improved their overall ability to maintain independence. The program objectives of improved financial performance were met through exceeding the reduction of 30-day readmission to 8%; operational effectiveness and quality patient outcomes were met through the design and implementation of the NP Care Model and overall patient-reported satisfaction.

Future research. The use of hand-held technology in chronic disease management require further study to address a correlation between improved patient engagement and patient activation in disease self-management and reduced readmissions. A number of patients could not be included in this program because of a lack of health literacy. This represents a significant limitation given the high rate of functional illiteracy in the United States, along with the complexity of the illness management regimen needed for most patients with HF. Last, further development of reliable and sensitive self-report and observer-related specific measures for study population would also be useful in the future.

Implications for practice. The NP Care Model created a structured approach to chronic disease management in concert with collaboration of the physician and multidisciplinary services. Nurse practitioners embody the expertise and knowledge for coordinating a multidisciplinary approach in the treatment of chronic disease. Additional NP roles developed from this program include the services of urology, oncology, and woman’s health/breast surgery. Management plans are now formed collaboratively by the attending physician and NP. The NP completes the discharge summary for all patients on the day of discharge to enhance timely insurance reimbursement, and to communicate about follow-up with the primary care providers. The NPs in the service lines provide continuity of care to the patients and, through the coordination of discharge plans, are familiar with community resources that would benefit the patient after the acute care experience. This framework of using service line NPs has created the ideal team situation, utilizing the strengths of all team members.

Conclusion
Contributions by NPs can be maximized by deliberately and thoughtfully integrating their practice into the organization’s culture. Creating a culture that integrates the NP is a worthwhile organizational investment to enhance optimal NP practice to benefit patients, families, and physician colleagues (Kleinpell, 2005). NP contributions to improving patient outcomes and reducing health care costs have been demonstrated definitively (Cohen, 1993; Horrocks, Anderson, & Salisbury, 2002; Mundinger et al., 2000). Nurse practitioners are viewed as outcomes-focused and goal-oriented team members. When problems and indicators are defined, process and outcome measures are articulated and benchmarked. NPs can then implement processes to collect data to help demonstrate their effect on outcomes and possible organizational cost savings over time, such as decreased length of stay and fewer readmissions.

Today’s health care system is complex. A major contribution NPs can make in this environment is to be solution oriented. Looking ahead to solutions is the best approach to address challenges and problems. Creating a NP culture takes time, energy, and fortitude. Building alliances with all disciplines takes confidence, trust, and respect of self and oth-
ers. Creating a NP-conducive culture is a worthwhile investment for the organization’s success, for the benefit of their NPs and, most importantly, for the patients and families they serve.

REFERENCES


ADDITIONAL READINGS


