Role of the Nurse in Chronic Illness Management: Making The Medical Home More Effective

IMPROVING CARE FOR individuals with chronic illnesses is perhaps the greatest challenge facing the U.S. health care system. Forty-eight percent of all Americans and 87% of seniors insured through Medicare have at least one chronic condition, and the health care provided to these individuals is responsible for 83% of total U.S. health care spending (Schneider, O’Donnell, & Dean, 2009; Vogeli et al., 2007). Moreover, almost half of the population with chronic conditions have more than one (Johns Hopkins University, 2004); so the challenge to the health care system is compounded by the need to address the needs of individuals with multi-morbidities.

Traditional chronic disease management that focuses on single conditions such as diabetes, coronary artery disease, or depression does not meet the needs of patients with multi-morbidities. Although some programs have shown success in improving outcomes for a specific condition (Gilbody, Bower, Fletcher, Richards, & Sutton, 2006; McAlister, Lawson, Teo, & Armstrong, 2001; Shojania et al., 2006), patients with multi-morbidities typically seek care from a variety of specialties and care providers, which can lead to fragmented care and suboptimal outcomes.

The transformation of primary care in the United States and the adoption of collaborative chronic disease care programs have focused new attention on the role registered nurses can play in improving care for patients with multi-morbidities. To test a team-based collaborative approach for patients with multi-morbidities and the role nurses can play in this process, a TEAMcare medical home pilot was implemented within a primary care clinic organized using patient-centered medical home principles.

Results showed a nurse-led collaborative care program based on the TEAMcare protocol can be practically applied within routine primary settings for patients with complex health care needs and multi-morbidities.

Health care systems should consider a greater role for nurses within a collaborative care model to achieve improved clinical outcomes and more appropriate use of health services for patients with multi-morbidities.

EXECUTIVE SUMMARY

- Traditional chronic disease management that focuses on single conditions does not meet the needs of patients with multi-morbidities.
- The transformation of primary care in the United States and the adoption of collaborative chronic disease care programs have focused new attention on the role registered nurses can play in improving care for patients with multi-morbidities.
- To test a team-based collaborative approach for patients with multi-morbidities and the role nurses can play in this process, a TEAMcare medical home pilot was implemented within a primary care clinic organized using patient-centered medical home principles.
- Results showed a nurse-led collaborative care program based on the TEAMcare protocol can be practically applied within routine primary settings for patients with complex health care needs and multi-morbidities.
- Health care systems should consider a greater role for nurses within a collaborative care model to achieve improved clinical outcomes and more appropriate use of health services for patients with multi-morbidities.

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receive complex medication regimens. Fragmented, condition-specific care contributes to a high risk of harmful drug interactions, duplicative and costly services, and poor health outcomes (Bodenheimer & Berry-Millett, 2009). The U.S. Department of Health and Human Services (DHHS, 2010) proposed a strategic framework of chronic disease management for natural clusters of diseases that commonly co-occur and have similar treatment.

The challenge of addressing the needs of patients with multimorbidities has led to interventions that focus on the patient rather than the disease. The greatest success has been found among programs that use a collaborative team-based approach to care management (Smith, Souhbi, Fortin, Hudon, & O'Dowd, 2012). The value of a team-based approach to chronic disease management has occurred alongside the growing recognition of the role that a robust and re-energized primary care delivery system, organized by principles of the patient-centered medical home (PCMH), must play in improving care for all individuals but particularly those with chronic medical needs. The PCMH emphasizes access and long-term relationships between patients and their care providers in order to increase the comprehensiveness and coordination of care, both of which are necessary to providing better and more consistent care to individuals with chronic conditions.

The transformation of primary care in the United States and the adoption of collaborative chronic disease care programs have focused new attention on the role that registered nurses (RNs) can play in improving care for patients with multi-morbidities. Ambulatory RNs are skilled in patient assessment and care coordination and can deploy a wide range of interventions in both face-to-face and telephone encounters. As members of a health care team, ambulatory RNs provide care for a wide range of patient needs: wellness, acute episodic care, chronic disease management, transition from inpatient to outpatient, and end-of-life services (Tomcavage, Littlewood, Salek, & Scandia, 2012). They must support and influence patients and families in decision making about their care needs including education and support for self-care. Each of these skills is central to the vision of collaborative population-based care within the PCMH primary care model.

To test a team-based collaborative approach for patients with multi-morbidities and the role nurses can play in this process, we implemented a TEAMcare medical home pilot within a primary care clinic organized using patient-centered medical home principles. The TEAMcare multi-condition collaborative care model has been tested in a randomized controlled trial that demonstrated the efficacy of RNs collaborating with primary care physicians and psychiatrists to provide integrated and systematic chronic disease care for depressed patients with uncontrolled diabetes and/or heart disease (Katon et al., 2010; Lin et al., 2012a, 2012b). Patients receiving this multi-condition collaborative care intervention also reported higher satisfaction, better quality of life, improved functioning, as well as the potential to reduce total health care costs, when compared to patients receiving usual primary care (Katon et al., 2012; Von Korff et al., 2011). We tested whether this model can be implemented in a real world setting, achieving the same results as obtained by the trial using the versatile skill set of RNs as key members of a multidisciplinary primary care team. The Group Health Institutional Review Board determined this project was a quality improvement effort and thus was conducted as an exempt activity.

### Research Setting and Methods

The TEAMcare medical home pilot was implemented within a primary care clinic operated by Group Health Cooperative, an integrated health care and health insurance system that provides comprehensive health and preventive care on a pre-paid basis to approximately 600,000 individuals in 20 of 39 counties in Washington state and 2 counties in Northern Idaho. The Group Health population closely resembles the underlying community with respect to age, race, and gender. Group Health owns and operates 25 primary care clinics throughout the Puget Sound Region of Western Washington and metropolitan Spokane, WA, with all of these clinics organized on patient-centered medical home principles. Group Health offers pre-paid capitated health insurance through each major market segment including Medicare, commercial insurance provided through public and private employers, a state “gap” plan called the Basic Health Plan, and individual and family plans. Individuals insured through Medicaid, which make up less than 5% of Group Health’s total enrollment, receive care through a fee-for-service contract with the State of Washington.

The primary care clinic in which the pilot was conducted is located in metropolitan Seattle and serves a smaller and slightly older set of patients than other clinics in the Seattle metropolitan area. The pilot clinic has approximately 12,000 patients and is staffed by 8 primary care physicians sharing 7.2 FTEs, and 3 RNs with 2.5 FTEs among other primary care team members. Patients recruited for the TEAMcare medical home pilot had uncontrolled hypertension (systolic blood pressure [BP] greater than 140 and diastolic BP greater than 90), uncontrolled diabetes [glycosylated hemoglobin (HbA1c)] greater
than 8], and depression, with a score of 10 or greater on the Patient Health Questionnaire-9 (PHQ-9).

As part of the transition to the PCMH that took place across all of Group Health’s primary care clinics (Hsu et al., 2012), this pilot clinic already had a standard workflow for chronic disease management and the TEAMcare model was adapted for this standard work. This program had an RN working closely with a primary care physician and a psychiatric consultant to provide patient-centered and coordinated chronic illness care. Each patient had a care plan developed with treatment goals and clinical targets developed collaboratively by the patient, nurse, and primary care physician. The collaborative care team, which included a consulting psychiatrist, primary care physician, and nurse care managers, held weekly systematic case review meetings to (a) clarify specific and achievable clinical targets and self-care goals, (b) update patient progress, (c) recommend treatment intensification if a patient has not achieved his or her goals (pharmacotherapy, self-care enhancements, or referrals), and (d) care coordination and followup care. If the patient’s primary care physician did not participate in the case review, he or she reviewed and acted on the treatment recommendations formulated by the medical or psychiatric physician consultant. The physician consultants, both medical and psychiatric, reviewed the history and clinical data for patients in the caseload. Using evidence-based treatment guidelines, the physician consultant discussed treatment adjustments for depression, diabetes, and coronary heart disease (CHD) that are individualized to help the patient achieve his or her clinical target and personal or functional goals. These recommendations included pharmacotherapy and psychosocial and behavioral treatment or referrals to specialty and community services. These systematic weekly case reviews helped to ensure clinician accountability for helping their patients achieve better outcomes.

Three clinic nurses, two primary care clinic team-based and one complex case manager nurse, received a day-long training in systematic care management that included (a) treatment guidelines for depression, diabetes, and reducing CHD risk factors, hypertension, and hyperlipidemia; (b) patient-centered communication skills to set goals and formulate treatment plans; and (c) health behavior change approaches (behavioral activation, problem-solving, and motivational interviewing) to enhance patient self-care and medication adherence. Reinforcement of this training also occurred on a weekly basis through detailed case discussion of the nurse care manager’s caseload. Booster training sessions were provided to help nurses become more effective in working with their challenging patients to achieve specific health behavior.

Changes in HbA1c, systolic BP, and PHQ-9 scores were assessed along with key components of health care use for 1 year after patients were enrolled in the TEAMcare medical home pilot, relative to the 12 months prior to program enrollment. To assess relative change in clinical outcomes and health care use among TEAMcare patients, two sets of comparator patients with either hypertension, HbA1c greater than 8, and PHQ-9 scores greater than 10 receiving usual care for their chronic illnesses were identified. One set of comparator patients received primary care services in the same clinic as patients enrolled in the TEAMcare medical home pilot; the other received primary care services at the Group Health owned and operated clinic closest to the clinic at which the TEAMcare model was introduced. The goal for including comparator patients within the same clinic as the TEAMcare pilot as well as patients receiving care at a different clinic was to assess whether there was any clinic-wide impact of the manner in which patients in the TEAMcare medical home pilot are cared for as compared to other patients seen at the same clinic who receive routine care.

Differences in HbA1c, systolic and diastolic BP, and PHQ-9 scores were tested as well as primary care and emergency department visits 1 year following enrollment in the TEAMcare medical home pilot using a generalized estimating equation model that adjusted for demographic factors and medical co-morbidities as well as prior year measures for each outcome. Chi-squared tests were used to examine differences in baseline values for each clinical and health service outcome.

To inform health care systems considering the TEAMcare model within their own settings, the financial impact of implementing the TEAMcare program was also assessed. Total program costs were examined, including the time spent by team-based nurses and the complex case manager nurse in direct patient care and support, preparing for and documenting encounters, and in consultation with primary and specialty providers about patient care. Estimates of program costs include the time spent by nurses and the primary care physician in weekly, 1.5-hour meetings to review patient needs and progress. To support the cost analysis, nurses kept detailed logs of patient-specific contact time. Group Health human resource records were accessed to determine salary support for these staff members and a microcosting model was used to assign costs to the time spent by all clinical staff in providing TEAMcare services.

The impact of TEAMcare on various aspects of health care use likely impacted by improved multi-condition collaborative care.
management, specifically rates of primary care visits, emergency department use, and pharmacy dispenses of medications was measured. Measures of health service use were collected from Group Health’s automated information systems, which capture all services used by enrollees provided within the integrated group practice and contract providers for which claims are submitted.

Results

Descriptive information on the patients receiving the TEAMcare medical home pilot intervention and comparator patients are presented in Table 1. TEAMcare medical home pilot patients were more likely to be men and had higher baseline HbA1c and PHQ-9 scores than comparators. Tests of difference in adjusted clinical outcomes for TEAMcare patients relative to comparators are reported in Table 2. There are significant improvements in each clinical measure from the year before to the year following enrollment for TEAMcare pilot cases with no change in these clinical outcomes for the comparator groups.

Data from the logs kept by nurses was used to calculate the time spent delivering the program: preparing, coordinating, and delivering clinical encounters which can be in-person or by telephone. TEAMcare medical home pilot services are presented as total hours per patient (see Table 3a) and in minutes per encounter (see Table 3b) for 1 year following the pilot’s start. Nurses spent an average of 11.6 hours per patient (median time 11 hours) and 37 minutes per encounter (median time of minutes). Mean hourly nurse salary for the three nurses that delivered the TEAMcare med-

Table 1.
Sample Characteristics

<table>
<thead>
<tr>
<th></th>
<th>TEAMcare Cases</th>
<th>Same Clinic Comparators</th>
<th>Different Clinic Comparators</th>
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<tbody>
<tr>
<td>N</td>
<td>44</td>
<td>179</td>
<td>151</td>
</tr>
<tr>
<td>Percent female</td>
<td>40.0</td>
<td>52.5</td>
<td>52.3</td>
</tr>
<tr>
<td>Mean age (SD)</td>
<td>60.5 (13.8)</td>
<td>57.5 (15.5)</td>
<td>60.4 (15.7)</td>
</tr>
<tr>
<td>Mean (SD) HbA1c year prior to enrollment</td>
<td>8.1 (1.2)</td>
<td>6.4 (1.4)</td>
<td>5.9 (0.9)</td>
</tr>
<tr>
<td>Mean (SD) systolic BP year prior to enrollment</td>
<td>130.7 (13.6)</td>
<td>140.3 (13.8)</td>
<td>136.8 (12.8)</td>
</tr>
<tr>
<td>Mean (SD) diastolic BP year prior to enrollment</td>
<td>73.1 (8.1)</td>
<td>85.9 (8.9)</td>
<td>81.8 (9.8)</td>
</tr>
<tr>
<td>Mean (SD) PHQ-9 year prior to enrollment</td>
<td>15.1 (5.8)</td>
<td>9.8 (5.6)</td>
<td>7.2 (6.8)</td>
</tr>
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Table 2.
Pre and Post Differences in Clinical Measures for Diabetes, Blood Pressure, and Depression

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Year Post</th>
<th>Difference</th>
<th>P Value for Difference between TEAMcare Pilot Cases and Comparators</th>
</tr>
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<tbody>
<tr>
<td>HbA1c</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TEAMcare pilot cases</td>
<td>8.1</td>
<td>6.4</td>
<td>-1.6</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Same clinic comparators</td>
<td>6.0</td>
<td>7.8</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>Different clinic comparators</td>
<td>6.7</td>
<td>6.4</td>
<td>-0.29</td>
<td></td>
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<tr>
<td>Systolic BP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEAMcare pilot cases</td>
<td>130.7</td>
<td>127.8</td>
<td>-2.97</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Same clinic comparators</td>
<td>140.4</td>
<td>138.5</td>
<td>-1.87</td>
<td></td>
</tr>
<tr>
<td>Different clinic comparators</td>
<td>136.8</td>
<td>136.9</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>PHQ-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEAMcare pilot cases</td>
<td>14.6</td>
<td>8.8</td>
<td>-5.8</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Same clinic comparators</td>
<td>9.3</td>
<td>8.7</td>
<td>-0.6</td>
<td></td>
</tr>
<tr>
<td>Different clinic comparators</td>
<td>7.5</td>
<td>5.8</td>
<td>-1.76</td>
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The TEAMcare medical home pilot intervention was $58.46 per hour, which includes a 40% Group Health benefits rate. The cost of physician time was based on average Group Health primary care physician compensation. This resulted in an estimate of $632.47 per patient per year in direct salary support for nurse case managers. The largest component of this cost (46.5% or $294) was spent in direct patient contact. The per encounter cost was estimated by applying the mean nurse salary to the minutes per encounter recorded in logs, which generated a cost of $40 per encounter with half of these costs attributable to direct patient contact.

The total cost of the program includes the costs of patient care, preparation and documentation, and the weekly huddles. To estimate these costs, nurse and physician time were added for 1.5 hours per week with mean Group Health primary care provider compensation of $108.17 per hour with a 35% benefit rate as the basis for determining the lead TEAMcare medical home pilot physician salary. Based on the number of patients served by the TEAMcare medical home pilot, the cost per patient estimate of these huddles is $550.16 per year. This amount includes the prorated patient time of all patients’ care being addressed in weekly huddles by the primary care lead and the nurse case managers, with the combined direct patient care and huddle costs resulting in a total estimated program cost per patient per year of $1,182.63. The costs of space or other clinic overhead were not included as the TEAMcare program used existing resources and imposed no additional costs on clinic functioning.

Rates of change in health service use from 1 year before to 1 year after individuals were enrolled in TEAMcare relative to comparators are shown in Figure 1. TEAMcare patients had increases in both pharmacy dispenses and ambulatory primary care visits, and greater declines in emergency department visits relative to comparators, although this difference was not statistically significant.

Discussion

The TEAMcare medical home implementation pilot demonstrated the feasibility of adapting an evidence-based collaborative intervention for patients with multimorbidities. This innovative model was delivered by existing primary care physicians and nurses working in a busy patient-centered medical home clinic. Clinical outcomes for diabetes, hypertension, and depression among the TEAMcare pilot patients showed significant improvement relative to comparators, as was found in the original randomized controlled trial (Katon et al., 2010).

We expected to see observed declines in emergency department use and increases in both primary care visits and pharmacy dispensations as a result of the TEAMcare program. A greater number of primary care encounters suggests more proactive time addressing health care issues rather than emergency department visits that suggest a reaction to exacerbations of chronic needs in an environment less conducive to coordinated care provided by a patient’s primary care team. Greater medication dis-
penses captured in the pharmacy data suggest patients are more likely to fill prescriptions and therefore be more adherent to their recommended medication regimen. Although utilization rates also improved for comparators, the greater relative decline in emergency department visits and increases in pharmacy dispenses and primary care visits suggests an impact attributable to TEAM-care.

The RN time for delivering this program was less than originally expected. More importantly, RN time per patient was more focused and effective due to the use of structured visits, a treatment plan, and weekly huddles to guide RN and team interventions. The RN time was not excessive and allowed for the team RNs to assume other responsibilities such as telephone advice, team support, and managing same-day acute issues.

Improving care delivery in primary care is a challenge in the current U.S. health care system. Specifically, the PCMH model of primary care is widely regarded as leading to a reinvigorated primary care delivery system. While the PCMH focuses on an ongoing relationship with a personal physician along with a physician-directed medical team, there is insufficient information about the RN role in the medical home model. RNs in primary care are uniquely positioned to assess the needs of patients with chronic conditions and develop a plan in partnership with the primary care provider (Laughlin & Beisel, 2010).

Team-based care is needed not only because it is beyond the ability of any generalist physician to address the growing needs for evidence-based care, but also because other clinical team members, including nurses, are better able to deliver some important elements of care such as self-management support and care coordination (Wagner, 2000). As recognized by the Institute of Medicine (2011) in The Future of Nursing report, nursing is one of the most versatile occupations in health care and can fill many needs; not only do nurses have knowledge in the science of diagnosis and treatment of disease, but they also play central roles in assessing and triaging acute needs, care planning, monitoring, coaching, providing self-management support, educating and supporting caregivers, and coordinating with medical, community, and social resources. Nurses are well suited to advance patient-centeredness because of their traditional holistic perspective that attends to patient comfort, preferences, psychosocial needs, and the interplay with family and community. RNs in ambulatory care must be well versed in population management, use of evidence-based guidelines, self-care/management, and the use of screening tools.

Professional nursing is a vital component of the health care system. While 62% of the 3.1 million RNs in the United States work in acute care settings, a growing number are employed in outpatient settings. Currently 10.8% of hospital-employed nurses work in outpatient clinics and another 10.5% work in ambulatory care (DHHS, 2010). Historically, the role of RNs in ambulatory care and, more importantly, primary care was not well defined. RN roles were limited to telephone triage, patient education, and technical procedures such as infusions and medication administration (Laughlin & Beisel, 2010). As patients require higher levels of care outside the hospital, there is a growing need to define and quantify ambulatory RN roles.

Until recently, there has been insufficient evidence that specific nursing interventions delivered by an RN can positively impact and sustain outcomes for patients with multi-morbidities including those with depression. Recent studies demonstrate RNs can deliver specific interventions that include screening for depression, monitoring diabetes/hypertension, enhancement of self-care, and collaborating with the team to improve outcomes (Morgan et al., 2013; Tomcavage et al., 2012). This growing literature provides increasing support for the role of RNs in delivering interventions such as evidence-based guidelines, self-care/management, medication teaching, depression screening, and treating to target goals to improve clinical outcomes, depression, medication adherence, and self-management.

This implementation pilot successfully adapted a team-based and efficacious intervention developed in a randomized controlled trial into a patient-centered medical home clinic for patients with multi-morbidities. Better clinical outcomes were achieved through training of routine care providers, use of informatics tools in the patient medical records, timely feedback of patient clinical outcomes, and a multidisciplinary systematic case review process – all contributing to the feasibility and success of this program. Clinicians involved in the pilot also remarked on the benefits on teamwork and team roles that resulted from participation in this program. These encouraging results need to be interpreted with some caution as this pilot enrolled a relatively small number of patients.

The TEAMcare collaborative model is a viable paradigm for effective use of RNs in ambulatory care and, in particular, the patient-centered medical home model. The outcomes demonstrate RN-led interventions, in collaboration with a team-based approach to care, can positively impact clinical outcomes as well as patient satisfaction for patients with multi-morbidities. When RN time is focused, the overall time spent with this population is not overwhelming, allowing RNs to engage in other activities within the team. The model creates an opportunity...
for better definition of ambulatory RN roles.

The increasing complexity of care, along with a need for greater coordination of care, increases the demand for professional nurses in ambulatory settings (Mastal, 2010). Efforts to conserve financial resources and more effectively utilize all members of the health care team have resulted in a need to fully understand the economic impact of RNs in outpatient settings. There is growing evidence that ambulatory care RNs impact patient satisfaction, reduce adverse outcomes, improve quality patient outcomes, and reduce emergency room/hospital admissions through specific interventions (Haas, 2008; Laughlin & Beisel, 2010).

Conclusion

In this pilot study, a randomized clinical trial was used to test a TEAMcare collaborative care model for patients with depression and uncontrolled diabetes and/or heart disease (Katon et al., 2010; Lin et al., 2012a, 2012b; Von Korff et al., 2011) into routine care of a patient-centered medical home clinic, and compared the experience of patients experiencing this program to individuals receiving usual care. The analysis of pilot results revealed similar benefits with respect to clinical outcomes as achieved by the clinical trial. More appropriate use of health services was found among patients receiving TEAMcare; these individuals experienced fewer emergency department visits, and greater primary care visits and pharmacy services. These results suggest a nurse-led collaborative care program based on the TEAMcare protocol can be practically applied within routine primary settings for patients with complex health care needs and multi-morbidities. Health care systems should consider a greater role for nurses within a collaborative care model to achieve improved clinical outcomes and more appropriate use of health services for patients with multi-morbidities.

REFERENCES


