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A Nurse Coach Quality Improvement Intervention Feasibility and Treatment Fidelity

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As the U.S. population ages and chronic illness prevalence increases, new approaches to care are needed. Although large health systems have begun to respond to this challenge, most Americans seek care from practitioners functioning in small office settings. Implementing systematic sustainable changes for quality improvement in this setting remains an unresolved challenge. In this study, trained Nurse Coaches (NCs) were employed to assist practices in adopting a new model of patient care called Virtual Integrated Practice (VIP). The feasibility and treatment fidelity of this approach were assessed through process measures and interviews in three practices. Findings document high acceptance of the NC approach and consistent delivery of the intervention. Enactment of the VIP model took place across practices, although to a variable degree. The study suggests that NCs may be an effective delivery method for quality and organizational improvements in small primary care practices.

Keywords: *nurse coach; chronic disease management; interdisciplinary teams; diabetes*

Deficits in the delivery of health care to persons with chronic diseases have been well-documented. The Institute of Medicine's *Crossing the Quality Chasm* (1998) described U.S. health care as lacking

well-organized programs to provide the full complement of services needed by people with such chronic conditions as heart disease, cancer, diabetes and

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asthma. Nor do we have mechanisms to coordinate the full range of services needed by those with multiple serious illnesses. (p. 29)

A Rand study found that adherence to established standards of care for 25 chronic diseases and conditions were met on average only 54% of the time (McGlynn et al., 2003). These deficits in health care delivery result in avoidable morbidity and mortality.

New approaches to chronic care are clearly needed, and these interventions should target the major sources of clinical services. Most Americans receive the bulk of their medical care from primary care practitioners functioning largely in small office settings, and 60% of those practices consist of five or fewer physicians (Wassenaar & Thran, 2003). Ninety percent of diabetic patients in the United States receive their care from primary care practices (Rothman & Wagner, 2003).

The design and implementation of interventions for small-group primary care practices present specific challenges. Studies of diabetes, congestive heart failure, and asthma have demonstrated that team-based interventions often are needed to address these complex conditions (Farris et al., 2004; Hroschikoski et al., 2006; Kaissi & Parchman, 2006; Lapidos & Rothschild, 2004; Rosen & Rodriguez, 2006; Wagner et al., 2001). Small-group practices not only lack the multidisciplinary personnel needed for such teams but also the resources, time, and space to convene teams. To better manage the care of adults with diabetes type 2, the research team developed an intervention called Virtual Integrated Practice (VIP). The VIP intervention has been described in detail elsewhere (Rothschild, Lapidos, Minnick, Fogg, & Catrambone, 2004). Briefly, the VIP intervention provides a tool box approach to allow practices to identify and collaborate with other practitioners in their community who are stakeholders or care providers for patients with diabetes. For example, a practice seeking to improve diabetes care might work with a social worker through the local diabetes association, a hospital-based dietitian, a pharmacist, and a podiatrist. This team (sometimes called a community of practice) collaborates using one or more of four VIP methods: (a) planned communications in which the team members decide what data to share, which information needs to be communicated in real-time, and how best to communicate; (b) standardized clinical processes that identify specific responsibilities for each member of the team and a structured work flow process through the office and community; (c) patient self-management in which all of the team members help the patient to identify individual care goals and use problem solving and other self-management techniques; and (d) group activities, such as health classes or group medical visits, to enhance efficiency and consistency.

Two years into this 4-year project, it became evident that practices were having difficulty adopting and applying VIP interventions. Although the VIP approach addressed the space and resource issues, practices were found to have insufficient time to devote to making the process changes that would ensure that every patient received care consistent with the recommended procedures of the American Diabetes Association (2007).

The use of Nurse Coaches (NCs) was designed to address this time issue. Experienced nurses could be placed within a practice to support diabetes management, and this support would gradually withdraw during a period of 6 months. The three participating practices agreed that a permanent, full-time coach was not needed and that the economics of most primary care practices would not allow hiring a permanent nurse for this purpose. Practices indicated a preference for a part-time NC to assist in improving existing systems and develop new programs if performance improvement was demonstrated.

Definition: Nurse Coach (NC)

The NC is defined as a catalyst and facilitator of practice adaptation and integration of VIP tools and processes into the practice, thus improving patient care processes. The NC's role is one of advisor, observer, and change agent. The NC has neither direct patient contact at any time nor clinical or administrative responsibilities in the practice. Although the NC is charged with identifying and mentoring a "champion" from within the practice who would ultimately ensure enactment of the VIP behaviors, the role does not include traditional employee performance evaluations.

The NC model was believed by practices to be economically attractive if three to four practices contracted for an NC annually. It also appealed to the study sites because it enabled them to work consistently with nurses who would understand their practices, something unavailable from typical consulting arrangements. Initial responses regarding sustainability of such an intervention resulted in a commitment to the NC model.

Small group practices are often fiercely independent and may be resistant to change. Consequently, determining feasibility and treatment fidelity are necessary early in the development of an intervention protocol in such settings. For more than 20 years, behavioral scientists have identified serious problems associated with treatment fidelity (Bellg et al., 2004; Horner, Rew, & Torres, 2006; Oxman et al., 2006; Perrin et al., 2006; Resnick et al., 2005; Santacroce, Maccarelli, & Grey, 2004). If researchers cannot ascertain that a proposed treatment is delivered as intended, intervention efficacy cannot be assessed accurately.

To address this issue, Lichstein and colleagues have developed a Treatment Implementation Model (TIM). Key components of TIM are delivery of the intervention, which refers to treatment presentation; receipt of the intervention, which refers to accuracy of the client's comprehension of the treatment; and enactment of the intervention, which refers to the extent of out-of-session application initiated by the client. For each domain, researchers must document both the means of induction of the intervention and the means of assessment (Lichstein, Riedel, & Grieve, 1994).

Purpose

The use of an NC as a VIP interventionist has been untested in terms of delivery and receipt, essential steps prior to examining if and how practices enact the VIP model. The purpose of this study is to describe (a) the feasibility of NCs as interventionists in delivering the VIP quality improvement intervention and (b) the extent of treatment fidelity in terms of delivery and receipt.

Method

Overview: Sites and NC Activities

The study was conducted after approval by the institutional review board to ensure the protection of human subjects. The practices approached for the study had to serve adults with diabetes and be willing to consider working with an NC. The volunteers had to be nongovernmental, urban practices located in the Midwestern area and have a reputation of quality and innovation within the medical center and community. The NC role was implemented in three volunteer, urban, Midwestern practices: a general internal medicine practice (two physicians) serving a largely White and African American population, an internal medicine practice (five physicians) serving a very ethnically and racially diverse population, and a family practice office (three physicians) caring for a population that was more than 50% Mexican American. As private entities, the practices faced economic and quality challenges typical of many U.S. office practices.

The NC was budgeted to spend approximately 12 to 16 hours per week at a practice site for 4 months and then to taper time in the practice to 0 during the last 2 months of the intervention. The NC role was organized around eight NC activity domains and specific tasks (see Table 1). Prior to discontinuation of NC services, each NC assisted staff in preparing a continuation

Table 1
Nurse Coach (NC) Activity Domains and Specific Tasks

Domain	Tasks
1. Joining/forming the team	<p>Meet 1:1 with staff</p> <p>Gain understanding of office, patient paths</p> <p>Meet with doctor/staff to discuss goals, needs, improvement areas</p> <p>Observe how decisions are made and communicated</p> <p>Identify staff champion and help become advocate for VIP</p> <p>Make initial contacts with potential VIP team member inside and virtual members outside of practice</p>
2. Assessment	<p>Identify current use of audit tools/techniques</p> <p>Develop baseline audit tool if needed, validate with practice staff</p> <p>Conduct baseline quality audits and provide feedback to practice staff</p> <p>Ensure at least one staff understands how to conduct and report a quality audit</p>
3. Population-focused care	<p>Review data, clarify the qualitative goals practice leaders want to set</p> <p>Suggest qualitative quality improvement goals</p> <p>Facilitate discussion with virtual team members regarding how doctors want to treat these patients</p> <p>Identify special services needed for this population</p> <p>Identify how VIP can help obtain and maximize utility and efficiency services</p> <p>Assist practice in identifying patients at greatest risk</p> <p>Determine how staff can identify at-risk target patients using office systems</p> <p>Help staff develop and implement simple identifiers on charts of all target patients</p>
4. Process standardization	<p>Refer to work on paradigm shift when developing process standardization</p> <p>Help office develop simple processes to address at-risk patients</p> <p>Specify strategies/pathways/standards</p> <p>Review VIP strategies with key office staff and decide on initial strategic approach</p> <p>Ensure that team members know each other, roles, and goals</p>
5. Team building	<p>Ensure virtual team members understand their responsibilities in pathways</p> <p>Assist practice physicians and staff use pathway in daily practice</p> <p>Encourage office staff to build links to VIP team members for the physicians</p> <p>Serve as a conduit for feedback on how pathway is working and how to improve it</p>
6. Advanced VIP activities	<p>Review progress to date with physicians</p> <p>Determine if practice is ready for group visits or patient self-management program</p>
7. Ongoing VIP work	<p>Ensure agreed-on standardization processes are being carried out</p> <p>Determine if each office and virtual team member knows what they are doing</p> <p>Determine if office staff facilitates connections between physician and virtual team</p> <p>Find ways to build enthusiasm and excitement for VIP</p> <p>Identify reluctant team members and engage them in process</p> <p>Continue to build climate of trust and ongoing collaboration</p>
8. Second assessment	<p>Is staff able to conduct own follow-up audit?</p> <p>Level of practice staff excitement about accomplishments</p> <p>Are any practice culture changes noticeable?</p>

Note: VIP = Virtual Integrated Practice.

plan for VIP activities. Data regarding feasibility, delivery, and receipt were collected via NC report forms, NC interviews, and staff interviews.

NC Selection and Training

The VIP project manager recruited NCs through recommendations of hospital nursing staff and faculty. Candidates were registered nurses who held or were completing master's degrees in nursing. They were required to demonstrate comprehensive clinical experience in office care delivery, understanding of group practice management, familiarity with general standards and guidelines for disease management, and the ability to observe and evaluate primary care practice organization and culture with particular emphasis on the ability to assess and overcome potential barriers to behavior change. Three female NCs (mean years of nursing experience = 5.3) were retained and assigned to a primary care practice based on commuting convenience. NC training consisted of a 2-day orientation that included an overview of the VIP model of care, definition of the NC role, description of teamwork in a virtual environment, and the VIP implementation approach to process change. Training was delivered by project staff skilled in interdisciplinary team and quality improvement education and whose involvement was independent of the evaluation effort. Training involved role playing that allowed NCs to practice delivery of the intervention and also allowed project staff to verify the competence of the NCs prior to their placement in the practices. Additional orientation to the practice site was conducted on an individual basis with the trainer. The project staff member and the NC met with key practice staff to discuss the NC role and implementation of VIP processes.

Aim 1—Feasibility of the NC Intervention

Feasibility was assessed by measures of (a) practice acceptance and (b) NC response to the role. A practice's acceptance was assessed through interviews conducted by the research project director with the senior physician and selected clinic staff. At the conclusion of the NC activity in the practice, the clinic staff interview included an office nurse at two sites and the office manager at one site. The semistructured interview questions about the acceptability of the NC intervention included (a) the role of the NC in the implementation of VIP; (b) things the NC did that should be incorporated, modified, or avoided in future VIP work; and (c) the importance of the NC to the achievements of VIP goals to date. In addition, a project staff member debriefed NCs at the end

of the intervention period regarding job satisfaction and willingness to assume and/or promote the NC role in similar settings.

Aim 2—Intervention Adherence: Delivery and Receipt

The delivery of the VIP intervention was assessed chiefly through the NC Process Markers (NCPM) record. Receipt, which is at least partly a function of the belief of the intended recipient as to its reality, was ascertained by comparing staff interview responses with reports on the NCPM. The NCPM is an author-developed, 38-item, self-report of the coaching activities associated with the NC domains. Goals included activities related to introducing and implementing use of the four VIP tool box techniques. The NC completed the NCPM weekly. The date the task began and the date of completion (partially or totally) was recorded. NCs recorded notes and comments regarding each activity as the program moved from initiation to completion. The NCs faxed the forms to the study's research office on a monthly basis. Any questions regarding missing information or outliers were discussed with the NCs.

NCs also estimated and recorded the time spent in each of the eight activity clusters on a daily basis. The NC faxed the time forms to the study office each week. Two members of the study team interviewed each NC on a weekly basis to determine progress and implementation of VIP activities, obstacles, and challenges presenting at the practice sites and strategies for ongoing implementation and sustainability. During these sessions, the reliability of reports of nurse activities and time reporting requirement also was reascertained.

Receipt also was ascertained through structured practice staff interviews at the conclusion of the NC activities. The primary investigator (PI) and intervention project director met with the medical director of each of the three practices for a more extensive review at the end of the study period. The discussion provided additional information about the specific VIP processes being used by the practice and plans for sustaining the process changes enacted during the NC intervention.

Data Analysis

Descriptive statistics were generated using SPSS-PC version 14 for analysis of the NCPM. Excerpts from the interview field notes were reviewed by the study team and general themes were identified in relation to the acceptability of the NC intervention.

Results

Aim 1—Feasibility

Acceptability of NCs to practices. Physicians and nurses uniformly reported that the NC was instrumental in working with office staff to make changes in disease management processes and utilization of virtual team members. One staff member commented, “What a substantial impact small changes can make in day-to-day operations, even for a small practice like ours” (N.P., personal communication, September 10, 2003). NCs and practice staff observed that there was considerable pressure to use the NCs in direct care roles during the first weeks of the program. The temptation for overworked practices to use the NC as “free labor” in either patient care or in the implementation of the VIP protocol was both anticipated by the investigators and rigorously guarded against. Once the NCs had clarified their roles and their limitations, these restrictions were accepted by practitioners.

Acceptability of NC role for nurses. At the conclusion of their activity within the practice sites, the NCs reported a sense of accomplishment with their role. They felt that they worked well with the site champions and staff and were effective in promoting VIP process changes. The NCs felt that they succeeded, to varying degrees, in helping staff identify how VIP tools could be implemented, facilitating new office procedure and process designs, and strategizing on how best to sustain change after they left the practice. The challenges of the NC role varied by site based on the cohesiveness and stability of the practice staff, economic constraints, and direction and support from the medical director. This role was one that they would recommend to other experienced nursing colleagues.

Aim 2—Treatment Fidelity

Delivery. Table 2 describes NC activities during a 22-week period between January and June 2003. Each NC spent an average of 6.7 hours per week (range 4.0-10.6) in the practices to which they were assigned. The NC in Practice 3 continued activity during weeks 23 to 25. The three process domains with the highest total time spent were process standardization, population-focused care, and ongoing VIP work. The NCs from Practices 1 and 3 reported completing 94.7% of tasks. The NC from Practice 2 completed 71.1% of tasks, with limited activity in the categories of ongoing VIP work and second practice assessment. Although self-report was the primary method

Table 2
Nurse Coach (NC) Report of Activity Domain Task
Completion and Minutes Spent

Process Domain	Practice 1:		Practice 2:		Practice 3:		Total # Minutes
	% Completed (# minutes spent by NC)		% Completed (# minutes spent by NC)		% Completed (# minutes spent by NC)		
Joining/forming a team	100	(330)	83	(370)	100	(1650)	2,350
Assessment	75	(370)	75	(1150)	75	(225)	1,745
Population-focused care	100	(465)	88	(1320)	100	(2610)	4,395
Process standardization	100	(895)	100	(2800)	100	(4940)	8,635
Team building	100	(955)	86	(240)	100	(1750)	2,945
Advanced VIP activities	100	(705)	100	(900)	100	(860)	2,465
Ongoing VIP work	100	(1215)	33	(1005)	100	(1430)	3,560
Second assessment	100	(405)	0	(0)	67	(30)	435
Summary	94.7	(5340)	71.1	(7785)	94.7	(13405)	26,530

Note: VIP = Virtual Integrated Practice.

used to document NC activities, these reports were independently verified by interviews conducted with physicians and staff in the practices.

Receipt. Each intervention practice successfully identified a “practice champion” who worked closely with the NC and was responsible for leading VIP protocol implementation in the office. It also was noted that a key determinant for process changes was presence of at least one influential practice member, usually the lead physician in the group, to provide support for the champion. The process domain tasks and practice staff interviews independently documented that each NC succeeded in facilitating the adoption of VIP processes in the assigned practice. As shown in Table 2, most coaching goals for the practices were achieved.

Table 3 documents the receipt of the four VIP intervention tools by practice. Two practices demonstrated receipt of all four tools of the VIP intervention through the launching of at least one new use for each tool throughout the practice; the third practice demonstrated receipt in three out of four.

At the conclusion of the VIP study, the co-investigators met with clinical and administrative staff from each office practice to determine which VIP activities they planned to continue. The three practices indicated that they intended to continue the use of VIP methods including distribution and monitoring use of diabetic self-management records, circulation of patient

Table 3
Adoption of VIP Processes and Activities by Office Practice

VIP Process Change Tools	Practice 1	Practice 2	Practice 3
Planned communications	Formulated application of electronic health record (HER) for consult and referral requests. Innovated use of e-mail in HER with VIP team members. Telephone consultation with VIP pharmacist and social worker for specific patient needs.	Targeted letter to patients with diabetes mellitus (DM) needing dietetic counseling for glucose management.	Developed consult-specific referral forms for dietetics and pharmacy.
Structured visits		Generated reminder letters to patients for dietetic consultation and follow-up.	Developed clinical pathways for adherence to disease management guidelines. Displayed visual queues and prompts in office to enhance patient compliance and education (e.g., sign instructing DM patients to remove shoes for foot exam).
Group activities	Patients encouraged to participate in pharmacy and nutrition education activities.	On-site nutrition education (e.g., weight loss seminars).	Conducted pharmacy tours with instruction on medication management and economical approaches. Implemented group medical appointments.
Patient self-management	Distribution of wallet-sized diabetic cards for recording health history, visits, test results, etc.	Encouraged use of diabetic cards.	Distributed diabetic management cards and patient education materials.

Note: VIP = Virtual Integrated Practice.

education materials, maintenance of contact with their individual team members for consultation and patient referral, use of diabetic flow sheets in patient records, various adherence cues and reminders to patients both inside the office and external communication, and continued encouragement of patients to participate in health education activities. Each practice had developed explicit processes and staff members to maintain enactment of these approaches.

Discussion and Conclusions

Several examples from NC comments on the NCPM illustrate why time may have varied in each domain across the practices (Table 2). In Practices 1 and 3, a relatively small, team-oriented staff and a strong internal champion may have led to the relatively short time necessary to achieve team formation. In Practice 2, where there was no strong internal champion and very little initial sense of teamwork on the part of staff, the NC spent not only significant time in the forming of a team but also in team building and ensuring ongoing practice commitment throughout the project. The assessment domain took very little time in Practices 1 and 3 but for different reasons. In Practice 1, the NC noted that there was a relatively advanced computerized database, which was a part of the practice's commitment to moving toward population-focused care and process standardization.

In Practice 3, assessment time was minimal because it was readily apparent that for some assessment items the data did not exist. This lack of assessment data was at least partially attributed by the NC as the cause of the heavy time investment in ensuring that data were collected and audited within a framework that was population focused and committed to process examination. The related domains that stem from the assessment (population-focused care and process standardization) took 3 times as long as the next closest practice. The NC also often noted that working with a strong physician champion and a committed staff registered nurse (RN) within the practice offered more opportunities to implement a greater variety of VIP processes and activities.

Although most domain activities were completed, all three sites reported to have completed only three of the four assessment tasks. Ensuring that staff understands how to conduct and report a quality audit was problematic because of frequent staff changes. Completion of the second assessment was not accomplished in Practice 2 because the NC was still attempting to influence practice attitudes and adaptation of VIP processes. This practice was the least stable in terms of managing current organizational demands and supporting

practice change. Practice 3's NC reported in the second assessment that staff were not able to complete their own follow-up assessment.

One study limitation is the small sample size. The intervention was conducted in three office practices in the metropolitan Chicago area and may not be representative of other geographic areas or other services. Reliance on self-report is another limitation. The time that the NC spent in the office practices was not recorded by a second observer and is thus only a rough estimation of how time was spent. However, the time estimates allow a crude comparison of the differences between the practices in how NC time was allocated between the process domains.

Feedback from each of the three sites indicated a high degree of acceptability to physicians and office staff as well as the NCs. The NC is a feasible process for effecting organization and care delivery changes in a small practice setting.

The method for assessing intervention fidelity captured major activities and general time inputs. Use of the three NCs in the practice sites was found to have an impact on the ability of each site to implement self-selected and designed processes consistent with the VIP model of coordinated disease care. In each site assigned an NC, the practice was able to make identifiable changes in office protocols, introduction of visual cues and reminders to patients, increased emphasis on patient self-management tools and empowerment activities, and improved coordination between office staff and external virtual team members. There was no major variation between reports of NCs and practices regarding receipt and enactment.

The variation in time spent in each process domain and in the ability to complete the activities of each domain (see Table 2) have implications for practice enrollment and for the budgets of projects using an NC delivery method. The explanations from the NCs suggest that time needs per domain be estimated in terms of (a) the degree of information automation available at the practice, (b) the practice champion's strength of commitment and standing within the practice (in Practices 1 and 3, the champions were the senior physicians; in Practice 2, the champion was not), (c) the practice's current teamwork, and (d) the staff's experience with process standardization and population-focused care. Based on their experiences, these aspects also play roles in the ability of a practice to adopt and use VIP process tools and advanced activities. We have subsequently added assessments of these four aspects of practice readiness into our procedure for accepting practices into the VIP NC protocol.

The inability of all three sites to complete the training of a staff member to conduct and report quality audits has implications for the long-term success of

the VIP intervention. Further study to determine alternatives (e.g., having these activities done by the NC or an audit firm) and their impact on cost and acceptability to the practices is warranted.

NCs may be an effective delivery method for many types of quality and organizational improvements in practices, such as the VIP intervention. Now that the preliminary feasibility and treatment fidelity tracking methods have been established for this delivery agent, this delivery method needs to be tested in terms of its impact on staff's regular enactment of the specified improvement processes and, ultimately, important diabetic patient outcomes such as A1c levels, visual acuity, and skin integrity, as well as use and satisfaction with care. An additional avenue for future work is the determination of the NC approach to improve outcomes for other chronic conditions such as asthma.

If the NC intervention can be shown to improve patient outcomes, then determination of best pay practices/business models and adoption incentives must be made. The salary paid to NCs in this study was comparable to the geographic area's compensation for clinical nurse specialists. If a nurse wanted a full-time NC position at the proposed three to four practices per year, then the issue of fringe benefits would need to be addressed. Levels of NC adoption incentives for practices would have to be ascertained. If better clinical outcomes result in health care expenditure savings, then incentives could be linked to payments from third-party payers.

This study documents that the use of NCs can play a critical role in the delivery, receipt, and enactment of the VIP team intervention. It suggests that this role could be used in other studies of behavioral interventions in the primary care setting. NCs may be a delivery method for other types of quality and organizational improvements in practices.

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