Home-Based Blood Pressure Interventions for Blacks

Penny H. Feldman, PhD; Margaret V. McDonald, MSW; Jennifer M. Mongoven, MPH; Timothy R. Peng, PhD; Linda M. Gerber, PhD; Liliana E. Pezzin, PhD, JD

Abstract—Efforts to increase blood pressure (BP) control rates in blacks, a traditionally underserved high-risk population must address both provider practice and patient adherence issues. The home-based BP Intervention for blacks study is a 3-arm randomized controlled trial designed to test 2 strategies to improve hypertension management and outcomes in a decentralized service setting serving a vulnerable and complex home care population. The primary study outcomes are systolic BP, diastolic BP, and BP control; secondary outcomes are nurse adherence to hypertension management recommendations and patient adherence to medication, healthy diet, and other self-management strategies. Nurses (n = 312) in a nonprofit Medicare-certified home health agency are randomized along with their eligible hypertensive patients (n = 845). The 2 interventions being tested are (1) a “basic” intervention delivering key evidence-based reminders to home care nurses and patients while the patient is receiving traditional postacute home health care; and (2) an “augmented” intervention that includes that same as the basic intervention, plus transition to an ongoing Hypertension Home Support Program that extends support for 12 months. Outcomes are measured at 3 and 12 months after baseline interview. The interventions will be assessed relative to usual care and to each other. Systems change to improve BP management and outcomes in home health will not easily occur without new intervention models and rigorous evaluation of their impact. Results from this trial will provide important information on potential strategies to improve BP control in a low-income chronically ill patient population. (Circ Cardiovasc Qual Outcomes. 2009;2:241-248.)

Key Words: hypertension ■ blood pressure ■ black ■ home care services

Hypertension (HTN) is a chronic condition for which adherence to prescribed medication and dietary and behavioral regimens yields a high “payoff” in terms of improved blood pressure (BP) control. Adherence interventions found to be effective over the long term generally have been multifaceted. However, no single strategy or programmatic focus has shown a clear advantage over others. This article describes a randomized controlled trial (RCT) designed to assess the effectiveness and cost-effectiveness of 2 organizational interventions intended to increase adherence to prescribed HTN regimens and improve BP control among black patients admitted to home health care. Home care is a relatively unstudied part of the health care system that serves a chronically ill population.

Home health nursing personnel are uniquely positioned to help vulnerable individuals achieve adequate BP control. Keeping abreast of evidence-based practices, teaching patients about their conditions, promoting patient self-management, helping patients adhere to medical, dietary, and exercise regimens established by their physicians, and linking them to medical and community resources are central to the home health nurse’s role. However, HTN management has not been a high priority for guideline adoption or quality improvement activities in the home care setting. By comparing 2 approaches—one “basic,” shorter-term, and less complex, and one longer-term, “augmented,” and more comprehensive—and by examining their impact at 2 points in time (3 months and 12 months poststudy enrollment), this study will allow us to derive new and important inferences about the relationship between the complexity and duration of interventions and the scope and duration of their impacts. The data provided by this study potentially will provide significant policy-relevant information in support of revamping or extending the current Medicare home health care benefit.

Setting Context: Home Health Care

Home health care is a noninstitutional diverse health care setting that provides skilled nursing and therapy services to a high-risk population characterized by multiple chronic conditions and significant needs for both medical and self-care management. In 2005, Medicare–Medicaid certified home health agencies discharged over 3.3 million patients, most of whom entered care from the hospital. Approximately 85% of home care episodes are for people 65 years of age or older; HTN and diabetes are the most common chronic conditions in this population, followed by arthritis and musculoskeletal diseases, heart failure, chronic pulmonary disease, and ischemic heart disease.
Despite the high prevalence of HTN in the home care population, home health nurses often see elevated BP readings as "a set of numbers rather than a condition to be managed." A variety of factors may contribute to this view. Clinician "inertia" has been cited as a common phenomenon leading to suboptimal HTN treatment.6,7 Perceived lower benefits or heightened risk of adverse events associated with treatment may lead clinicians to overlook high BP among older patients, despite the fact that their baseline BP rates are higher and that HTN therapy has been shown to reduce short term risks of stroke and heart failure even among people older than 80 years of age.5,9 Further, very few patients come into home care with a primary diagnosis of HTN. Multiple comorbidities, sometimes compounded by challenging socioeconomic or familial circumstances (eg, low income, poor housing or weak family supports), may lead to competing treatment priorities and divert the nurse’s attention away from HTN within the typical 24-day median length of home care stay.10

Conceptual Framework
This study focuses on influencing home health care nurse and patient behavior—and indirectly on influencing the patient’s physician—to improve implementation of Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) hypertension management recommendations. The study’s multifaceted interventions were informed by Andersen’s Behavioral Model11, 12 and Green and Kreuter’s Precede-Proceed Model13 (see Figure). Andersen’s model focuses on the role of predisposing and enabling factors, in conjunction with perceived need, as predictors or drivers of personal health practices and use of health services. The Precede–Proceed model focuses on the role of these factors, in conjunction with reinforcement mechanisms, in promoting provider and patient behavior change.

Changing Patient Behavior
Andersen’s Behavioral Model has evolved over time as the dynamics of the health care system have changed, and has been adapted for vulnerable populations.11,12 The core of the model postulates that certain population characteristics can either facilitate or impede patient health practices and service use. “Predisposing” characteristics include demographics, health beliefs/knowledge, and social structure. “Enabling” characteristics include personal/family resources and community resources. “Need” includes perceived health and evaluated health. Some of these characteristics are relatively fixed, whereas others are potentially mutable via outside intervention. This study focuses on mutable patient characteristics to influence BP control behavior and service use. The basic or less intensive intervention study arm seeks to influence patients through strategies aimed at their predisposing knowledge, awareness, and perceived need for treatment. Accordingly, patients receive educational materials, home BP monitors, log books, and recommended BP targets to help them better understand their condition and gauge their own HTN-related risk or need. The more intensive augmented arm supplements these tools with a 12-month HTN support program that extends beyond the typical home health stay and seeks to influence a broader range of patient-level predisposing and enabling characteristics, including “activation” level or self-management preparedness, link to a regular primary care physician, and appropriate health service use.

Nurse Practice Change
We used the Precede–Proceed model13 to conceptualize factors influencing nurse practice change. The model emphasizes the influence of predisposing, enabling, and reinforcing factors on practitioner behavior. Predisposing factors include individual practitioner characteristics—eg, training, knowledge, and beliefs—that affect motivation to change. Enabling factors include organizational and structural factors—eg, reminders, checklists, or information systems—that facilitate change. Finally, reinforcing factors include incentives that reward selected behaviors. Both intervention arms of the study focus primarily on enabling factors to influence the behavior of home care nurses randomized to intervention status. Specifically, we use e-mail reminders to promote evidence-based practices. The “dual task theory” of performance14 posits that organizing and presenting cogent information at critical times to reduce clinician overload, along with directing clinicians to tasks needing their attention, will improve the performance of “secondary” preventive tasks in conjunction with hands-on medical care. Chueh and Barnett15 describe “just-in-time” reminders to identify patients who are candidates for a particular guideline and to send that guideline to the clinician “at the right time and place.” Numerous studies support reminders to improve clinical practice.16,17 A recent Cochrane review of HTN RCTs found that such
reminders effectively directed physician attention to recom-
mended HTN practices and improved patient appointment-
keeping.\textsuperscript{18} In addition, our own heart-failure (HF) research found
that just-in-time e-mail reminders significantly improved both
nurses’ adherence to HF guidelines\textsuperscript{19} and patients’ HF-specific
outcomes.\textsuperscript{20} This study builds on that experience by examining
the impact of evidence-based reminders and information feed-
back for another condition (HTN) in home care, a distinct
subpopulation (blacks), and both separately and in conjunction
with a longer lasting and more comprehensive intervention (the
HTN Home Support Program).

\begin{tcolorbox}
WHAT IS KNOWN

- There is a substantial literature on the use of multi-
faceted interventions to promote 1) positive clinical
practice change, 2) support patient adherence and/or
3) improve patient outcomes. Few studies examine
all three aspects together and in the HTN context, as
does the study we report on here. We will be
measuring: 1) clinician (i.e., home health nurses’) adherence to JN7 HTN guidelines as documented in electronic patient records; 2) self-reported patient adherence to medication, diet and exercise recommenda-
tions; AND 3) changes in BP control as measured by blinded study ‘interviewers’ at 3
months and 12 months post study enrollment.

WHAT THE STUDY ADDS

- This study builds on the authors own heart-failure
(HF) research found that just-in-time email remind-
ers significantly improved both nurses’ adherence to
HF guidelines and patients’ HF-specific outcomes by
examining the impact of evidence-based reminders and
information feedback for another condition (HTN) in home care, a distinct subpopulation (African Americans), and both separately and in conjunction
with a longer lasting and more comprehensive intervention (the HTN Home Support Program).

- To our knowledge, this is the first rigorous, signifi-
cant scale HTN management RCT we know of that is
being conducted in the home health care setting,
which serves more than 3 million adults each year.
The study targets a high risk, low income, aging
African American patient population. The majority
of study enrollees are characterized by multiple
comorbidities; as many as 6 in 10 have diabetes and
many evidence other HTN risk factors, such as
obesity. (This has been substantiated in preliminary
analyses, but the data are not reported in this
manuscript.)

- The study’s “augmented” intervention – the HTN
Home Support Program – has potentially significant
policy implications in that it is testing a longitudinal
chronic disease management approach in a post-
acute services delivery setting that has been domi-
nated by Medicare-reimbursed episodic care.

\end{tcolorbox}

Study Design

The project uses a randomized design to assess the effective-
ness and cost-effectiveness of the basic and augmented
interventions relative to usual care. Each intervention is
intended to improve BP control among the target population
by increasing evidence-based, JNC 7–consistent practice
among nurses, achieving effective pharmacological manage-
ment for patients, and strengthening patient adherence to
appropriate medication and behavior regimes. The basic
intervention delivers key evidence-based information to
nurses and patients while the patient is receiving traditional
postacute home health care; the augmented interventional is a
more ambitious organizational change that transitions pa-
tients to a HTN Home Support Program and extends the
information, monitoring, and feedback available to patients
and their primary care physicians for a 12-month period
beyond an index home care admission. Randomization occurs
at the nurse level, and a nurse’s initial random assignment to
a specific group (usual care, basic treatment or augmented
intervention) determines the status for all new patients allocated
to that particular nurse’s care for the duration of the study.

Study Site and Population

The study is being conducted in the acute care division of a
large urban, nonprofit, Medicare-certified home health care
organization. The majority of patients are admitted to home
are immediately after a hospital discharge; others come
through community referrals (primarily physicians). Usual
care involves a nurse “coordinator of care” responsible for
developing and implementing a plan of care based on the
physician’s orders and the nurse’s patient evaluation at
admission. Other skilled professionals (therapists; social
workers) provide visits as needed, and home health aides may
be assigned to assist with personal care. The agency’s nursing
workforce, like that employed by most home health agencies,
is mainly generalist, widely dispersed, and receives infre-
quent on-site clinical supervision.

The study population consists of home health nurses and
the eligible HTN patients they serve. Potentially eligible
patients are those identified through agency electronic rec-
dars as 21 through 80 years of age, black, English speaking,
and admitted to the agency with a primary, secondary, or
tertiary diagnosis of HTN (ICD9-CM 401, 402, 403, or 404).
Only those whose BP at the time of the recruitment interview
is \( \geq 140 \text{ mm Hg systolic or } \geq 90 \text{ mm Hg diastolic}
(\geq 130 \text{ mm Hg systolic or } \geq 80 \text{ mm Hg diastolic})\) BP for
patients with diabetes or chronic kidney disease) are included.
The eligibility BP is taken by trained field interviewers
blinded to intervention status using a Microlife Model
3AA1-2 device programmed to take 3 readings and provide
an average. This monitor uses an oscillometric algorithm that
has been validated using the British Hypertension Society
(BHS) criteria. Exclusion criteria include a coidagnosis of
dementia, other organic brain disorder, or other cognitive
impairment, severe heart failure, or end-stage renal disease.
Also excluded are patients on dialysis, those with a kidney
transplant, participants in another disease management pro-
gram, or those with a predicted life expectancy of less than 6
months. A study baseline accrual of 845 patients was targeted.
to yield an ultimate sample size of 600 at 12-month follow-up, accounting for approximately 30% attrition attributable to study subject death, nursing home admission, moves out of catchment area, survey refusals, and lack of availability within specified 12-month interview window.

**Interventions**

The basic intervention relies on care provided by home health nurses during the routine home health stay. The augmented intervention adds an HTN study nurse (hereafter called the “HTN nurse”) and a health educator, who are responsible for assuring a patient’s smooth transition to the HTN Home Support Program and for delivering the main components of that intervention (see Table 1). Both interventions are multifaceted in that they focus on at least 2 or 3 key individuals—the patient, the home care nurse, and the primary care physician—and target 2 or more aspects of care, including information and feedback, decision support, community linkages, patient self-management tools, or delivery system design. They are also multifaceted in that they address not only appropriate pharmacological management of HTN but also evidence-based behavior changes including modification of sodium intake, physical inactivity, and other risk behaviors. All of these intervention components have been tested individually or in various combinations in published RCTs and other research studies, many HTN specific. However, the literature does not “advantage” any individual component or combination, even though it supports multifaceted interventions overall.1,18,21

**Patient Educational Materials (Patient “Predisposing” Factor)**

Patients whose nurses are randomized to both the basic and augmented intervention groups receive educational material. The JNC 7 patient guide “Lowering your Blood Pressure” is mailed to basic group members with the recommendation that they review the guide and ask their home care nurse or primary care physician if they have any questions. Patients in the augmented group receive a home visit by the HTN nurse and a detailed workbook with 10 chapters to be used over the course of the intervention. Each chapter provides information on a specific topic followed by a practical activity or interactive tool to reinforce the learning. For example, the chapter on how to properly take your own blood pressure is followed by a BP log that the patient is asked to complete each week; the chapter on diet is followed by a variety of recipes and a menu planning guide. Whenever possible culturally specific information is integrated into the content, and information is presented at a 5th grade reading level. When the content is more challenging, the study protocol calls for the HTN nurse to review with the patient until the material is assimilated.

**Automated Home BP Monitors (Patient “Perceived Need” Factor)**

Patients in both intervention groups receive their own Microlife Model 3AA1-2 device. Patients receive written and verbal instructions on the proper procedures to follow in taking BP and how to use the device, as well as a recommendation to record their readings regularly to share with their home care nurses and their primary care physicians. The purpose of the device is to increase a patient’s awareness of his/her BP and, ideally, increase participation in behaviors that will help maintain BP control. In the augmented arm the HTN nurse regularly reviews the BP logs with the patient to determine whether the patient’s physician should be contacted to consider medication adjustments.

**Evidence-Based E-Mail Messages to Home Care Nurses (Nurse “Enabling” Factor)**

Nurses in both intervention groups receive an e-mail targeted to a specific HTN patient shortly after a patient on their caseload has been interviewed and enrolled as a study participant. The message relays information on the key nursing-specific practices required to support the JNC 7 recommendations relayed in a study team created “4M” approach—Measure, Monitor, Modify, Motivate—and a weblink to the guideline. The top section of Table 2 displays the first screen of the e-mail message. Additional information follows on the 4 Ms, including instructions on proper BP measurement, medication information, and suggestions on how to work with the patient on promoting healthy behavior. The e-mail suggests a lower target BP for in-home read-
ings as per recommendations in the JNC 7. A second e-mail message goes out 7 days later with information on the “5A” model (see lower section of Table 2) to encourage nurses to provide their patients with self-management support. Agency policy specifies that home care nurses review their e-mail at least once each work day to access new messages and announcements.

HTN Home Support Program (Patient “Enabling” Factor and Service Use/“Health Behavior” Intermediate Outcome)

The Home Support Program, which is the key additional component of the augmented intervention, is intended to complement the traditional home care service and then extend patient support beyond discharge from the acute home care episode. In view of the Behavioral Model, the HTN Home Support Program provides enabling support to patients to strengthen their self-management readiness and skills, help them adhere to recommended medication and behavioral regimens, and communicate more effectively with their primary care physician. Trained intervention staff use patient-centered motivational interviewing (MI) techniques, found to enhance readiness to change in varied contexts, to help patients overcome ambivalence about making health behavior changes and move toward a commitment to change. Each structured counseling session includes (1) setting a small behavioral change goal in collaboration with the patient; (2) using a 0 to 10 numeric scale to assess the importance of the set goal to the patient and confidence that the goal can be achieved before the next contact; and (3) collaborative individualized problem solving to overcome identified barriers to achieving the set goal. Intervention staff participate in a total of 12 hours training on MI. Initially they have 2 4-hour “in classroom” educational sessions with an outside MI specialist. These sessions include (1) the history, purpose, and evidence for MI; (2) the role of MI in the augmented intervention; and (3) a video of MI clinician-patient sessions; and (4) role playing. Two 2-hour “booster” sessions follow over the course of the intervention period.

The HTN Support Program is divided into 2 phases conducted over a 12-month period (see Table 3). In the 3-month Phase 1, the HTN nurse conducts 6 structured phone calls to follow the home visit. At the end of Phase 1, patients and their physicians receive a BP chart. The frequency of contact and level of HTN nurse and health educator involvement in Phase 2 depend on the patient’s BP at the end of Phase 1 and are adjusted throughout Phase 2 depending on the patient’s BP. The health educator alone conducts quarterly calls with patients achieving pre-HTN or normal BP levels and monthly calls with patients at Stage 1 HTN. Patients with Stage 2 BP receive weekly calls (1 per month from the nurse and 3 per month from the educator) until they achieve better BP control. The duration of each call depends on the need to review medication changes and health updates and the time required to establish goals in the MI component. In general, the HTN nurse’s role is to encourage and support the patient to be the prime contact with the patient’s physician; however, patients who “linger” in Stage 2 sometimes trigger direct and frequent nurse-physician communication to find an effective medication regimen. Involvement in the home support program is also a health behavior intermediate...
The quantitative data captured in the database will allow tabulation of frequency/duration of contacts to be used in analyzing intervention dose/response relationships. The qualitative data will be used to help interpret study results.

**Outcomes**

This study has 3 major aims: (1) to examine the effect of the basic and the augmented interventions on HTN practice among home health care nurses; (2) to examine the effect of the basic and augmented interventions on patients’ BP outcomes, medications, and HTN self-management; and (3) to estimate the costs associated with the respective intervention strategies and subsequent care, and to compare these costs across interventions. To address these aims, we are making use of data from 5 main sources: (1) mainframe data and patient-level clinical and functional assessment data derived from OASIS, the nationally mandated home care Outcomes Assessment and Information Set; (2) patient clinical records, which will be reviewed for nurse documentation of HTN assessment, management and teaching of self-care; (3) patient interviews conducted at baseline (enrollment in the study) and at 3 and 12 months after study enrollment; (4) administrative data routinely collected by the agency’s billing and human resources departments; and (5) intervention cost data collected especially for this study. Information to be obtained is summarized in Table 4.

The analysis will estimate the impact of the basic and augmented interventions on nursing practices and processes of care, on patient outcomes and HTN self-management, and on costs. Regression models will be used to control for differences among nurses in the 3 groups with respect to characteristics that might influence practices or processes of care. Regression models also will be used to control for differences across patient groups that might influence behavior, service use, BP, or other health outcomes. Estimates of treatment-control group differences (for both treatments) generated by these models will be tested for statistical significance to determine the extent to which observed differences at the nurse and patient levels are attributable to the alternative intervention strategies.

**Study Implementation: Challenges and Lessons Learned to Date**

Although this research team has conducted several intervention studies in the urban home care environment, each time we are in the field we are reacquainted with the complexity of the lives of so many of the patients in our low-income population. Reflecting on the adapted Behavioral Model for vulnerable populations developed by Gelberg, Andersen and Leake,11 we have identified several predisposing factors that present significant challenges to patients in all three arms of the study, that are influencing the extent of patient engagement in the home-care support program (eg, BP self-monitoring, participating in scheduled phone calls). Among the most vexing predisposing barriers to full participation are: housing issues (foreclosures, evictions), substance abuse, and literacy issues (inability to read or comprehend educational material even at the elementary school level). An additional challenge for staff has been advocating HTN management

<table>
<thead>
<tr>
<th>Table 3. Components of HTN Home Support Program</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Tools:</strong></td>
</tr>
<tr>
<td>● Home BP monitoring device</td>
</tr>
<tr>
<td>● BP log</td>
</tr>
<tr>
<td>● Educational workbook with interactive tools for learning</td>
</tr>
<tr>
<td><strong>Phase 1 (months 1–3):</strong></td>
</tr>
<tr>
<td>● Initial home visit by HTN nurse clinical coordinator</td>
</tr>
<tr>
<td>1. Medication review</td>
</tr>
<tr>
<td>2. Adherence assessment</td>
</tr>
<tr>
<td>3. Assessment of lifestyle risk factors</td>
</tr>
<tr>
<td>4. Instruction on home BP device</td>
</tr>
<tr>
<td>● Interactive phone counseling session with HTN nurse clinical coordinator every 2 weeks. Core topic areas:</td>
</tr>
<tr>
<td>1. Your BP and your health</td>
</tr>
<tr>
<td>2. Setting goals</td>
</tr>
<tr>
<td>3. Living with chronic conditions</td>
</tr>
<tr>
<td>4. Medication management</td>
</tr>
<tr>
<td>5. Diet and physical activity</td>
</tr>
<tr>
<td>6. Staying the course/Stress Management</td>
</tr>
<tr>
<td>● BP log numbers requested at each contact</td>
</tr>
<tr>
<td>● Goal setting at each contact</td>
</tr>
<tr>
<td>● Coordination with primary care provider when needed</td>
</tr>
<tr>
<td>1. Inform of patient participation in program</td>
</tr>
<tr>
<td>2. Provision of recent BP record</td>
</tr>
<tr>
<td>3. Review of reported adherence</td>
</tr>
<tr>
<td>4. Review of medication management</td>
</tr>
<tr>
<td>● Work with patient on medication adjustment as necessary</td>
</tr>
<tr>
<td><strong>Phase 2 (months 4–12):</strong></td>
</tr>
<tr>
<td>● Health educator joins collaboration</td>
</tr>
<tr>
<td>● Phone contacts, with frequency determined by patient BP stage</td>
</tr>
<tr>
<td>Range—weekly health education contact to quarterly contact</td>
</tr>
<tr>
<td>Monthly calls by nurse when in higher BP ranges</td>
</tr>
<tr>
<td>● BP log numbers requested at each contact</td>
</tr>
<tr>
<td>● Continued use of goal setting and motivational interviewing techniques with focus on DASH diet recommendations, promoting physical activity and medication adherence</td>
</tr>
<tr>
<td>● Coordination with primary care provider when needed</td>
</tr>
</tbody>
</table>

DASH indicates dietary approaches to stop hypertension.
when many patients have significant comorbidities (eg, diabetes, cancer) that cause greater apparent discomfort and fully occupy the immediate attention of patients, families, and formal caregivers. HTN support staff acknowledge these issues and to the extent possible provide referrals to additional support services outside the scope of what the project provides (eg, support groups, housing authority, department of the aging). However, given the limitations of the underlying social safety net, housing stock, and educational and health care systems, the staff simply do not have access to a rich enough

Table 4. Information to be Collected and Used in Analysis

<table>
<thead>
<tr>
<th>Data on Home Care Nurses and Their Patterns of HTN Care</th>
<th>Baseline</th>
<th>3 Months</th>
<th>12 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provision of nursing services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of home care nursing visits</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Average duration of service (length of stay)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Patterns of HTN care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of nursing care plans that include documentation of key evidence-based HTN practices</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Proportion of a nurse’s patients taught HTN self-management guidelines</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Physician contacts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of patient’s with nurse-initiated doctor contacts</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nurse characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education, job tenure, caseload, region</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient characteristics, outcomes, service use, and HTN management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socioeconomic demographics, medical conditions, comorbidities, functional status, informal supports, literacy</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Newly diagnosed medical conditions</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Clinical and functional outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood pressure measurement</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Health-related quality of life (EuroQol)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Cardiovascular events</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>HTN management outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication profile</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Adherence to HTN medication regimen (Hill-Bone)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Management of diet and physical activity (REAP)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HTN medication adherence barriers (BMQ)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HTN management and medication knowledge</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Self-management activation level (PAM)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Assessment of care (modified PACIC)</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Service Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>ED use (visits)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Outpatient/physician visits (doctor visits)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Organizational and system costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention costs: email transmissions, patient educational material, intervention nurse and health educator time</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Home care related costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of nurse, therapy, social work and aide home care visits</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Overall medical care costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nights in hospital, ED visits, doctor visits</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Medication costs</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

REAP indicates rapid eating assessment for patients; BMQ, Barriers to Medications Questionnaire; PAM, patient activation measure; PACIC, patient assessment of care for chronic conditions; ED, emergency department.
panoply of resources to fully mitigate or resolve the array of obstacles that constitute the “worry burden” of some patients.

In the category of “enabling” factors, the intervention team also has found challenges in connecting patients to necessary primary care resources. The team is serving an inner-city patient population who commonly use clinic-based delivery services in academic health centers. These clinics, in turn, primarily use rotating interns and medical residents, so a patient may be assigned to a new physician every few months, making the identification and ability to reach a patient’s primary care provider difficult. This challenge was anticipated, but the amount of time spent trying to make a connection and implement an improved HTN management plan before a rotation change has been more time consuming than expected. Another physician issue relates to resistance to making medication changes or focusing on the target ranges recommended by the JNC 7 guideline. In the words of one physician, “As long as her blood pressure is 180 or under that is fine with me.” In instances like this the HTN nurse provides the physician with the patient’s BP log along with JNC 7 information. If the patient continues to have such an elevated BP level and the physician does not make any care plan changes, the home support team assists the patient with scheduling a visit with an HTN specialist.

In all cases, the HTN nurse works with the patient on how to keep a BP log, provides concrete suggestions to support treatment adherence, and queries about possible medication side effects. In addition, the intervention staff work with all patients to develop more effective ways of communicating with their doctor. For example, all patients are encouraged to routinely bring a list of all their medications to each physician visit, prepare a list of questions and concerns in advance, and ask about treatment choices. The strategy is focused on providing patients with improved activation and self-management skills that can be used over the life course for HTN management, as well as for any other chronic condition that needs to be addressed.

Uncontrolled BP contributes significantly to morbidity, mortality, and patient care costs. The underlying premise of the project is that systems change to improve BP management, and outcomes will not easily occur in home health care without new intervention models, rigorous evaluation of their impact, or efforts by opinion leaders in the clinical and research communities to disseminate information on strategies that are efficacious and cost-effective. The evidence for strategies that improve HTN is available. Getting patients and providers to put this evidence into practice is what we are striving toward.

Sources of Funding
This work was supported by a grant from the National Heart, Lung, and Blood Institute (R01 HL078585, Home-Base BP Interventions for African Americans; principal investigator: Penny H. Feldman).

Disclosures
None.

References
Home-Based Blood Pressure Interventions for Blacks
Penny H. Feldman, Margaret V. McDonald, Jennifer M. Mongoven, Timothy R. Peng, Linda M. Gerber and Liliana E. Pezzin

doi: 10.1161/CIRCOUTCOMES.109.849943
Circulation: Cardiovascular Quality and Outcomes is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2009 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-7705. Online ISSN: 1941-7713

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circoutcomes.ahajournals.org/content/2/3/241

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation: Cardiovascular Quality and Outcomes can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation: Cardiovascular Quality and Outcomes is online at:
http://circoutcomes.ahajournals.org//subscriptions/