

## Using a Telemedicine System to Promote Patient Care Among Underserved Individuals

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<b>Organization:</b>	Temple University Clinical Research Center
<b>Mechanism:</b>	RFA: HS07-007: Ambulatory Safety and Quality Program: Enabling Patient-Centered Care through Health Information Technology (PCC)
<b>Grant Number:</b>	R18 HS 017202
<b>Project Period:</b>	September 2007 – August 2011
<b>AHRQ Funding Amount:</b>	\$1,198,371

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**Summary:** Hypertension affects more than 65 million people in the United States and disproportionately affects African Americans. Untreated hypertension is associated with an increased risk for myocardial infarction, sudden death, stroke, and renal failure. Despite the importance of controlling hypertension and the availability of therapy, the clinical application of well-established guidelines has been sub-optimal and inadequate blood pressure (BP) control remains common.

A patient-provider partnership is needed to advance care for chronic conditions such as hypertension. Patients should be empowered through education, self-management, collaborative goal setting, and treatment planning. Chronic disease management and prevention present unique challenges for patient-centered care (PCC) because patients are followed only through episodic office visits. Chronic disease care requires innovative strategies to support the constructs of PCC in an efficient and cost-effective manner. Telemedicine has the capacity to empower the patient, strengthen the patient-provider relationship, and support a chronic care model of PCC in a realistic and sustainable manner.

Dr. Bove and his research team developed a patient-centered tool for managing hypertension within a primary care practice. The project built upon a pre-existing, internally developed telemedicine system that patients accessed via the Internet. The system provided patient education on hypertension and served as a tool for self-management, shared decisionmaking, and treatment planning. A cellular telephone interactive system accommodated subjects who did not have Internet access. The system incorporated hypertension treatment guideline education modules; self-reporting modules on topics such as blood pressure, weight, exercise, diet, and smoking; and automated reminders and feedback.

The research team observed patients' responses to Joint National Committee care measures aimed at lowering their BP to normal. Patients completed one of seven lessons per login, after which they received an automated reminder of the guidelines. An automatic report created by the database was sent to the primary care physician and the patient on a monthly basis. The report described, in both text and graphics, the patient's BP over that month, the medications the patient was on, and whether the patient was at his or her goal BP. Additionally, the report recommended a physician visit to those who were not within the goal. The primary outcome measure of this randomized, controlled trial was the proportion of subjects who achieved goal blood pressure. Secondary measures included the rate of self-monitoring, exercise measured as steps per day, weight, cardiovascular disease knowledge, number of patients meeting medication guidelines, and satisfaction with the practice.

### Specific Aims:

- Enhance the current telemedicine system by incorporating guideline-based algorithms for hypertension treatment as well as automated reminders and feedback for both patients and health care providers. **(Achieved)**
- Determine the percentage of patients meeting guidelines for anti-hypertensive medication therapy. **(Achieved)**
- Empower inner-city African American patients to take a more active role in their health care through self-monitoring, education, reinforcement, and feedback through telemedicine. **(Achieved)**
- Measure telemedicine utilization. **(Achieved)**
- Examine the impact of the telemedicine system on medical knowledge, self-efficacy, and the quality of doctor-patient interaction as compared to controls. **(Achieved)**
- Compare blood pressure outcomes between control and telemedicine groups after 6 months of telemedicine risk management. **(Achieved)**

**2011 Activities:** Data collection was completed in early 2011. The remainder of the funding period was dedicated to data cleaning, coding, and analysis. Due to initial slow recruitment, the study team used a 1-year no-cost extension to allow additional time to meet the required sample size. As last self-reported in the AHRQ Research Reporting System, project progress and activities was mostly on track, and the project budget spending was roughly on target. This project was completed in August 2011.

**Preliminary Impact and Findings:** Project staff screened 536 subjects and enrolled 241 (45 percent) in the study. Of the total recruited subjects, 65 percent were female and 51 percent had access to the Internet. One-hundred-and-twenty participants (50 percent) were randomized into the telemedicine arm. The baseline data indicated that the demographics of the sample reflected the clinics' patient populations, and also indicated a need for improved cardiovascular risk management. The telemedicine group received a digital blood pressure meter and risk counseling. They were instructed to report BP, heart rate, weight, steps per day, and tobacco use twice weekly. All patients had baseline and 6-month followup visits.

During study implementation, the researchers found that the target population— inner city, African American patients— frequently had limited access to the Internet, which was the initial medium for the telemedicine intervention. The analysis also found a statistically significant relationship between income and home Internet access, where Internet access was the lowest for the low-income group. Early surveys, however, indicated that nearly all study participants had access to land or cellular phones. In response, the research team integrated an interactive voice response (IVR) component to their intervention to facilitate use by a broader population. IVR acted as an interface between patients and the telemedicine system and expanded access to the system.

An interim analysis indicated a statistically significant improvement from baseline in both intervention and control groups across systolic BP, diastolic BP, total cholesterol, low-density lipoproteins, high-density lipoproteins, triglycerides, and fasting blood glucose. Additionally, a significant decrease in systolic blood pressure was observed between the two study arms, indicating additional improvements in BP control over time in the telemedicine arm versus the control arm. In the final analysis, non-diabetic subjects in the telemedicine group demonstrated a significant decrease in BP. Diabetic subjects showed similar reductions in systolic BP in the telemedicine and control groups. Adherence to BP medication was similar among the two groups. A secondary analysis found an increase in prescribed medications in

the telemedicine group indicating that telemedicine also affected physician behavior. Overall, the study demonstrated that telemedicine was a useful tool for managing hypertension among asymptomatic non-diabetic subjects.

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**Target Population:** Adults, Chronic Care\*, Hypertension, Inner City\*, Medically Underserved, Racial or Ethnic Minorities\*: African Americans

**Strategic Goal:** Develop and disseminate health IT evidence and evidence-based tools to support patient-centered care, the coordination of care across transitions in care settings, and the use of electronic exchange of health information to improve quality of care.

**Business Goal:** Implementation and Use

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*\* This target population is one of AHRQ's priority populations.*