The Kaiser Permanente Northern California Story: Improving Hypertension Control From 44% to 90% in 13 Years (2000 to 2013)

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Hypertension is a leading risk for death and disability.[1] Nevertheless, in the late 1990s, fewer than half of Americans diagnosed with hypertension achieved controlled blood pressure (BP). This statistic also held true within Kaiser Permanente Northern California (KPNC). In 1999, KPNC organized a task force that included key physicians, administrators, data analysts, pharmacists, nurses, and other clinicians to improve the control of hypertension. A situational analysis was conducted to investigate the challenges that KPNC patients and clinicians faced in achieving BP control. In 2000, after a year of strategic planning, KPNC initiated our program to improve hypertension control. The critical components of the program[2] are described below and summarized in the Table.

HYPERTENSION REGISTRY

In order to help monitor and provide feedback on the impact of our program and assess the successes and remaining challenges in achieving BP control, it was necessary to identify people with hypertension and evaluate their progress in the health system. Therefore, a registry (a master list) was created by identifying hypertensive individuals using outpatient visit diagnosis codes, pharmacy data, and hospitalization records. We validated the accuracy of the registry inclusion criteria through random chart reviews. Over time, the registry has grown from 350,000 to more than 650,000 individuals. In 2001, our hypertension registry included roughly 15% of our adult membership. Today, the registry includes roughly 27% of our adult membership.

EVIDENCE-BASED HYPERTENSION GUIDELINES

To ensure KPNC patients were receiving up-to-date evidence-based treatment, we created and maintained a health system–wide evidence-based practice guideline. The hypertension guideline is updated every 2 years. To ensure rigor and relevance to primary and specialty care, the guideline development team included primary care and specialty physicians (such as cardiologists, nephrologists, and endocrinologists) as well as pharmacists and evidence-based methodologists.

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A critical characteristic of the hypertension guidelines has been a simplified drug treatment algorithm (protocol). Instead of listing several potential drug classes or several specific medications as potential options for each step in the protocol, a single specific drug with a recommended dose is advised in nearly all situations. This facilitates the use of fewer drugs, which can lead to improved familiarity, decreased practice variation, and simplification of teaching materials, resulting in increased efficiencies and potentially fewer medical errors. Clinicians are encouraged to follow the algorithm unless a specific clinical situation indicates the need for individual variation.

The hypertension guideline was aligned with other organizational guidelines to ensure consistent educational messages. For example, recommendations for BP management in the hypertension guideline were identical in our KPNC diabetes, coronary artery disease, and other guidelines. The guidelines were distributed in many forms, such as printed guideline documents, e-mail updates, pocket cards, posting to an internet library of online resources, televised videoconferences, and in-person lectures.

QUALITY PERFORMANCE METRICS

The registry and guideline were used to develop quality reports containing BP control data. Initially, a "manual" registry was used prior to KPNC's adoption of an electronic health record (EHR) beginning in 2005 and completed in 2008. Once completed, the EHR enabled more detailed and timely reporting based on a more complete and integrated registry.

In 2000, all KPNC clinic visits were associated with a paper coding form. Physicians were required to mark "bubbles" for diagnostic and procedure-related codes. These forms were collected locally and sent to a central scanning site where the visit documentation was analyzed. The form was modified to include two new rows, one with six systolic BP ranges and another with six diastolic BP ranges. These data were collected and analyzed centrally. Within 1 year, BP control measurements were available for the majority of people diagnosed with hypertension. This process was used from 2001 to 2008, by which time the EHR was fully implemented including recorded BPs.

A central physician-led management team reviewed the quality performance of the medical centers and identified medical centers with superior performance. We contacted the teams at those sites in order to identify best practices, and, in turn, to disseminate these

TABLE. Key Elements of the Kaiser Permanente Northern California Hypertension Program

Element	Description
Hypertension registry	Validated and comprehensive
Clinic level performance feedback	Facilitates operational and system-level change, transparent, and widely visible
Treatment algorithm	Based on evidence-based guidelines, simple and implementable
Medical assistant visits for blood pressure measurement	Appropriate use of ancillary staff skills and reduced barriers to patients
Single-pill combination therapy	Increased efficiency and increased adherence

learnings to other medical centers via training sessions, prepared lectures for redistribution and e-mail communications. Medical center directors (with strict processes to assure confidentiality and data integrity) used the medical center performance data to generate work plans for clinic-level quality improvement processes, and used individual physician-level performance metrics to provide clinician-specific performance improvement activities.

MEDICAL ASSISTANT BP VISITS

In 2007, we created medical assistant BP visits as an alternative to the traditional office visit with a physician. These visits were with a medical assistant, usually located in the primary care physician's medical station. Visits were usually scheduled 2 to 4 weeks following a BP medication adjustment. No copayment was charged for these visits. Typically, a medical assistant measured BP and informed the primary care physician, who then directed treatment intensification and follow-up care as needed. To ensure the accuracy of the BP measurement, medical assistants were trained using standardized materials and underwent periodic assessments of BP measurement technique competency.

SINGLE-PILL COMBINATION MEDICATIONS

In 2005, we incorporated a single-pill combination medication (lisinopril-hydrochlorothiazide) into our evidence-based guidelines. This therapy was promoted by developing both patient and physician education materials including e-mail communications, printed materials, pocket card clinician tools, and system-wide peer group meetings. From 2001 to 2009, the number of lisinopril-hydrochlorothiazide prescriptions increased from <20 to more than 23,000 prescriptions per month. During this period, the percentage of angiotensin-converting enzyme inhibitor prescriptions dispensed as lisinopril-hydrochlorothiazide increased from <1% to 27%.

In 2015, 14 years after the KPNC hypertension program was launched, the changes in hypertension care are easy to see. From 2001 to 2013, hypertension control in KPNC has increased from 44% to 90%. During approximately the same period of time, the rate of heart attacks has fallen 24%[3] and death from stroke has fallen 42%.[4] In addition, in our own personal practices, we see the difference in hypertension control every day. Now when we see patients in our offices, the majority have controlled BP. In the late 1990s, when uncontrolled BP was the norm, BP control rates of 90% seemed unimaginable. This was, and continues to be, a team effort—with thousands of physicians, pharmacists, nurses, mangers, data analysts, and others who work tirelessly to help our patients maintain healthy BP levels. How far we've come in the past 14 years!

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