

The following abstracts, from medical journals containing literature on hypertension, were selected for their relevance to this Special Report supplement.

Trends in Hypertension Prevalence and Therapy From 1950 to 1989

The increasing use of antihypertensive medication between 1950 and 1989 has reduced the prevalence of high blood pressure and produced a concomitant decline in left ventricular hypertrophy, according to the authors of this report. During this 4-decade period, the investigators obtained data from 10,333 participants in the Framingham Heart Study who were between the ages of 45 and 74 and found that the use of antihypertensive medications increased from 2.3% to 24.6% among men and from 5.7% to 27.7% among women. During this period, the age-adjusted prevalence of systolic blood pressure of at least 160 mm Hg or diastolic blood pressure of at least 100 mm Hg declined from 18.5% to 9.2% among men and from 28% to 7.7% among women. These declines were accompanied by age-adjusted reductions in the prevalence of electrocardiographic evidence of left ventricular hypertrophy, from 4.5% to 2.5% among men and from 3.6% to 1.1% among women. These findings, the authors note, may explain in part the considerable decline in mortality from cardiovascular disease observed during the late 1960s and in the 1970s and 1980s.

Mosterd A, D'Agostino RB, Silbershatz H, et al. Trends in the prevalence of hypertension, antihypertensive therapy, and left ventricular hypertrophy from 1950 to 1989. *N Engl J Med* 1999;340:1221-1227.

HEDIS 2000 Hypertension Measure

The HEDIS hypertension measure to assess whether blood pressure was controlled among adults between 46 and 85 years of age with diagnosed hypertension who are enrolled in managed care plans is calculated by the hybrid method. The hybrid specification comprises the denominator (a systematic sample drawn from the eligible population for Medicaid, Medicare, and commercial product lines whose hypertension diagnosis is confirmed by chart review) and the numerator (the number of people in the denominator whose blood pressure is adequately controlled in the measurement year). Confirmation of the diagnosis is supported by a notation of hypertension (HTN), high blood pressure (HBP), or blood pressure (BP) in the medical record anytime before June 30 of the measurement year. Statements such as "rule out hypertension," "possible hypertension," and "consistent with hypertension" are not sufficient to confirm the diagnosis of hypertension if such statements are the only mention(s) of hypertension in the medical record. Adequate control is defined as both a representative systolic blood pressure below 140 mm Hg and a representative diastolic blood pressure below 90 mm Hg. The representative blood pressure is defined as the blood pressure reading from the most recent visit during the measurement year, as long as the visit occurred after the diagnosis of hypertension was made. To qualify as the representative blood pressure, the reading must have been obtained during a visit to the practitioner's office or other nonemergency outpatient facility. Blood pressure measurements taken on the same day as a major diagnostic or surgical procedure (eg, sigmoidoscopy, stress test) or at an emergency room or measurements that are self-reported by the patient (eg, home or health fair readings) are not eligible. Managed care organizations may also exclude from the eligible population all members with end-stage renal disease.

Controlling high blood pressure (first year measure). *HEDIS*®2000. Washington, DC: NCQA Publication Center; February 3, 1999:80-83.

Risk Stratification of Treated Hypertensives

Although long-term control of blood pressure can be achieved in a general population, cardiovascular disease events still account for most of the morbidity and mortality among these treated hypertensives, say the authors of this report. In this prospective cohort study of participants in a worksite-based antihypertensive treatment program (1973 through 1994), the authors sought to define the distribution and determinants of cardiovascular disease events among the participants and to stratify them into risk groups on the basis of pretreatment clinical profiles. They studied 8690 systematically treated patients who had at least 6 months of follow-up (average, 5.7 years) and, at study entry, a systolic blood pressure of ≥ 160 mm Hg or a diastolic blood pressure of ≥ 95 mm Hg. After 1992, the blood pressure level required for study entry was $\geq 140/90$ mm Hg. Blood pressure control was achieved by the first year of therapy and maintained through 18 years. In nearly 50,000 person-years of follow-up, there were 468 cardiovascular disease events, which accounted for 68% of all deaths in the cohort. A risk stratification scheme was then constructed. The authors selected 5 pretreatment factors—history of heart attack, stroke, diabetes, age ≥ 55 years, and pulse pressure ≥ 60 mm Hg—to stratify patients into 4 groups. The 2999 patients with no risk factors were at low risk, the 3042 with 1 risk factor were at moderate risk, the 2237 with 2 risk factors were at high risk, and the 412 with 3 or more risk factors were at very high risk. These results demonstrate that it is possible to stratify patients according to the likelihood of subsequent events, despite adequate blood pressure control, on the basis of readily identifiable pretreatment factors. They also suggest that such a risk stratification scheme could help physicians target more aggressive therapy to patients at higher risk for subsequent cardiovascular events.

Alderman MH, Cohen H, Madhavan S. Distribution and determinants of cardiovascular events during 20 years of successful antihypertensive treatment. *J Hypertens* 1998;16:761-769.

Economic Value of Antihypertensive Medications

This paper assessed the economic value of antihypertensive medications by comparing the likelihood of coronary heart disease and stroke events and subsequent event treatment costs. The study used duration of blood pressure reduction to profile event risk reduction of 3 antihypertensive medications. Clinical data were used to determine the duration of blood pressure reduction achieved with use of 2 angiotensin-converting enzyme inhibitors and one angiotensin II receptor antagonist. Trough-to-peak ratios were used to calculate the reduction in risk of coronary heart disease and stroke events associated with each medication. The researchers found that different medications can be assessed across a number of different estimates of event treatment costs and population sizes. The method used for assessing the economic value of antihypertensive medications can be applied to other drug classes and can be further refined by integrating patient population and other risk-related data.

Roth MS, Davenport RC, Simpson W. Assessing the economic value of antihypertensive medications. *Am J Manag Care* 1998;4:1267-1275.

Managing Hypertensive Renal Disease

The authors of this review article note that it is necessary to control systolic and diastolic hypertension in order to reduce the incidence of hypertensive end-stage renal disease, which continues to increase annually. In addition, they say, reversible causes should be sought in any patient with hypertension who develops renal insufficiency. They recommend that blood pressure be reduced to 130/85 mm Hg to slow the progression of renal failure, and to 120/75 mm Hg in African-Americans with renal insufficiency and in patients with renal disease and proteinuria in excess of 1g/day. Although any antihypertensive regimen that effectively lowers blood pressure will help slow progressive renal failure, use of angiotensin-converting enzyme inhibitors is especially beneficial because these agents have been shown to reduce blood pressure and provide renoprotection in patients with renal insufficiency secondary to hypertension, glomerulonephritis, and diabetic nephropathy.

Moore MA, Epstein M, Agodoa L, Dworkin LD. Current strategies for management of hypertensive renal disease. *Arch Intern Med* 1999;159:23-38.

Combination Therapy and Renal Disease Progression

African Americans, persons with diabetic nephropathy, and persons with renal insufficiency or ≥ 1 g of proteinuria require blood pressure control of $< 130/85$ mm Hg to preserve renal function. Since single-agent therapy will never achieve this level of blood pressure control, multiple antihypertensive agents are necessary. However, compliance with therapy decreases as the number of medications increases. Fixed-dose combinations thus emerge as important alternatives to multiple-agent therapy because they achieve adequate reductions in blood pressure while maintaining compliance. Certain types of angiotensin-converting enzyme inhibitors and calcium channel blocker combinations seem to have better overall effects than do others in achieving adequate blood pressure control and preserving renal function. The author reviews these combinations with respect to blood pressure reduction and renal protection.

Bakris GL. The role of combination antihypertensive therapy and the progression of renal disease hypertension: Looking toward the next millennium. *Am J Hypertens* 1998;11:158S-162S.

The Pharmacist's View of Combination Therapy

The author of this article describes a review of the literature on the use of combination therapy versus monotherapy in hypertension and on the pharmacologic actions and appropriateness of 7 major antihypertensive combinations. The literature review focused on clinical studies dealing with the efficacy of combination therapy in reducing blood pressure and included major hypertension texts addressing combination therapy. Data from these sources were evaluated with respect to study design, clinical outcomes, and the use of antihypertensive classes commonly seen in practice. Available data show that angiotensin-converting enzyme (ACE) inhibitors plus diuretics or calcium channel blockers produce synergistic effects on blood pressure, and β -blockers plus diuretics or calcium channel blockers produce additive effects. Combinations that are ineffective include β -blockers plus ACE inhibitors and dihydropyridine calcium blockers plus diuretics, although there are specific circumstances where these combinations may be used clinically. The author points out that the pharmacist who understands and applies the pharmacology of these antihypertensive agents can help physicians make rational decisions when they select combination therapy.

Rodgers PT. Combination drug therapy in hypertension: A rational approach for the pharmacist. *J Am Pharm Assoc* 1998;38:469-479.