

# Antihypertensive Drug-Prescribing Patterns of Internists and Family Physicians

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*Surveys that evaluated antihypertensive drug-prescribing patterns were mailed to 150 family physicians and 150 primary care internists. The initial mailing was followed by a telephone follow-up and a second mailing. Forty-seven percent of family physicians and 41.9% of the internists who were still in practice returned the questionnaire. When asked about their choice of antihypertensive drug therapy for specific patients (based upon age, race, sex, and coexisting disease), the responses of the two specialties were similar. The only statistically significant difference was observed in the responses for a 58-year-old obese white woman with diabetes and renal impairment. In this example, the family physicians were more likely than internists to recommend an angiotensin converting enzyme inhibitor or a  $\beta$ -blocker ( $P=.036$ ). This study demonstrates that the majority of physicians individualized initial therapy for hypertension to the specific patient rather than strictly following a stepped-care approach with diuretics or  $\beta$ -blockers as initial therapy.*

Until recently, the guidelines for the initial pharmacologic treatment of hypertension included diuretics and  $\beta$ -blockers.<sup>1</sup> The selection of an appropriate first-line drug for monotherapy has become controversial, however. Some authors suggest that the antihypertensive agent should be tailored to likely hemodynamic aberrations and coexisting diseases.<sup>2-7</sup> Others feel that traditional stepped-care is preferred.<sup>8</sup>

Various surveys have examined antihypertensive drug-prescribing patterns of physicians. In a 1983 survey of Maryland physicians,<sup>9</sup> 89% of internists and 92% of family and general physicians stated that they would prescribe diuretics for initial first-step therapy. Examination of 1982 and 1983 prescribing patterns from the Michigan and Tennessee Medicaid programs<sup>10</sup> demonstrated that the majority of physicians (56%) prescribed diuretics. Less than 20% of patients were being treated with a medication other than a diuretic or a  $\beta$ -blocker. This latter study also examined the Tennessee Medicaid data after 1983 and found a four-fold increase in prescriptions for calcium channel blockers (1.8% to 7.3%) and captopril (0.7% to 3.3%).

In 1986, the Gallup Organization interviewed physicians in internal medicine, general practice, and family practice and found 76% initially prescribed a diuretic and 44% prescribed a  $\beta$ -blocker in at least some of their patients.<sup>11</sup> Internists, physicians who were concerned about cost, and those who followed the recommendations of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure were more likely to prescribe diuretics. In this study, 68% said they had recently changed the way they treated hypertension. Twenty-four percent used more  $\beta$ -blockers, 18% used angiotensin-converting enzyme (ACE) inhibitors, and 22% used fewer diuretics. Interestingly, 30% of these physicians did not use or know of the Joint National Committee's stepped-care recommendations, which at that time included diuretics or  $\beta$ -blockers for step 1.

These reports clearly indicate that physicians were primarily prescribing diuretics and  $\beta$ -blockers, but there was increasing use of calcium channel blockers and ACE inhibitors, even though these drugs were not recommended for step 1 therapy at that time. The most recent guidelines issued by the Joint National Committee in 1988<sup>12</sup> promoted individualized treatment and suggested that step 1 agents could include diuretics,  $\beta$ -blockers, ACE inhibitors, or calcium channel blockers.

The purpose of the present study was to examine antihypertensive drug-prescribing practices of internists and family physicians prior to the publication of the 1988 treat-

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**TABLE 1. PRACTICE CHARACTERISTICS (percentage) OF INTERNISTS AND FAMILY PHYSICIANS**

Characteristics	Family Physicians (N = 65)	Internists (N = 63)
Practice		
Solo	48	34
Single specialty group	31	37
Multidisciplinary group	20	27
Other	1	2
Total	100	100
Patients per week*		
<50	14	30
51-120	45	57
121-160	29	11
>161	12	2
Total	100	100
Community size†		
<5,000	47	0
5,000-14,999	23	15
15,000-49,999	5	19
50,000-99,999	14	26
>100,000	11	40
Total	100	100

\* P < .002 between specialties  
 † P < .001 between specialties

ment guidelines to determine the extent to which these physicians individualized step 1 therapy based upon patient age, race, and coexisting disease.

**METHODS**

Questionnaires were mailed to a random selection of 150 of 212 Iowa physicians who are licensed in internal medicine and 150 of 957 Iowa physicians who are licensed in family practice. The total sample of physicians was obtained from a list of all primary care physicians licensed in the state. The physicians who were selected were blindly chosen from a random computer-generated sequence. The 212 internists were those identified as primary care internists who were not board certified in a subspecialty. The survey elicited information concerning how the diagnoses of hypertension were made, behavioral therapy, and drug treatment. The questions of the survey that relate to prescribing are listed in the Appendix.

The initial questionnaire was mailed on March 31, 1988. After 2 weeks nonrespondents were telephoned and asked to complete the questionnaire. One week after the telephone call, nonrespondents were mailed another questionnaire to complete. Responses were considered usable if they were received before the publication of the 1988 treatment guidelines issued by the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure.<sup>12</sup>

The SYSTAT computer package was used to generate frequency statistics for each survey question.<sup>13</sup> The chi-square and Fisher's exact tests were used to determine associations between physician groups. A log-linear model was used to make comparisons between specialties.<sup>14</sup>

**TABLE 2. INITIAL ANTIHYPERTENSIVE MEDICATION THERAPY PRESCRIBED BY FAMILY PHYSICIANS AND INTERNISTS (percentage) FOR SPECIFIC PATIENT POPULATIONS**

Patient Type	β-Blocker		Calcium Channel Blocker		ACE Inhibitor		Diuretic		Total Number*	
	FP	IM	FP	IM	FP	IM	FP	IM	FP	IM
Age < 40	34.9	51.9	6.3	1.9	25.4	27.8	33.3	18.5	63	54
Black	15.9	9.4	13.6	15.1	20.5	17.0	50.0	58.5	44	53
Female	17.5	11.1	11.1	7.4	14.3	24.1	57.1	57.4	63	54
Low income	7.1	9.1	1.8	0	3.6	3.6	87.5	87.3	56	55
Diabetic	9.8	3.9	26.2	41.2	44.3	41.2	19.7	13.7	61	51
Elevated lipids†	8.2	7.9	32.8	41.2	42.6	45.1	16.4	5.9	61	51
Angina‡	31.1	32.7	62.3	60.0	1.6	1.8	4.9	5.5	61	55
Congestive heart failure	0	0	6.5	10.7	48.4	53.6	45.2	35.7	62	56
Renal disease	7.9	13.2	42.9	35.8	31.7	17.0	17.5	34.0	63	53

Note: The first number indicates the percentage of responses from family physicians (FP) and the second number indicates the percentage of responses from internists (IM). Physicians were asked to select the one drug class they would usually prescribe as initial therapy for patients with each of the above characteristics

\* Actual number of respondents for each patient characteristic

† Hyperlipidemia

‡ Angina and coronary vascular disease

ACE—angiotensin-converting enzyme



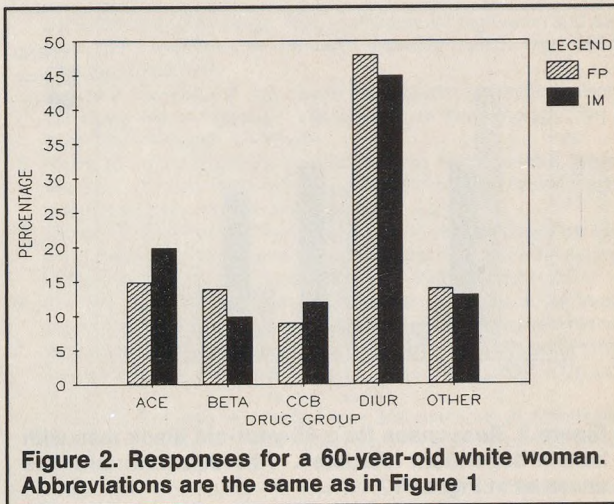
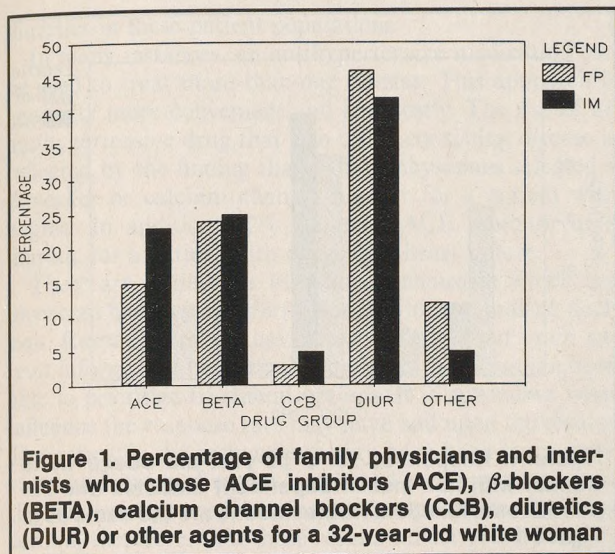


Figure 1. Percentage of family physicians and internists who chose ACE inhibitors (ACE),  $\beta$ -blockers (BETA), calcium channel blockers (CCB), diuretics (DIUR) or other agents for a 32-year-old white woman

Figure 2. Responses for a 60-year-old white woman. Abbreviations are the same as in Figure 1

RESULTS

Twelve family physicians and two internists were eliminated from the mailing list because they were no longer in practice. Questionnaires that were received from four internists were not used because these physicians had become board certified in a subspecialty. Questionnaires were received from 65 of 138 (47.1%) family physicians and 63 of 144 (43.8%) internists for a total response rate of 45.4%.

Forty-four of 65 (68%) family physicians were board certified and 51 of 63 (81%) of the internists were board certified. Significantly more internists (95%) than family physicians (48%) had completed residency training ( $P < .01$ ). Ninety-five percent of family physicians and 90% of internists were male. Practice information is displayed in Table 1.

Table 2 displays the prescribing responses with regard to specific patient populations by internists and family physicians. Overall, the frequencies for each drug category were similar between physician specialties, and there were no statistically significant differences when the data were fit with a log-linear model.

Both family physicians and internists were more likely to prescribe a  $\beta$ -blocker or ACE inhibitor for a young patient and diuretics for blacks, women, and patients with low income. Patients with diabetes and hyperlipidemia were more likely to receive a calcium channel blocker or an ACE inhibitor. Most patients with angina would be given a  $\beta$ -blocker or a calcium channel blocker, and patients with congestive heart failure would receive an ACE inhibitor or a diuretic.

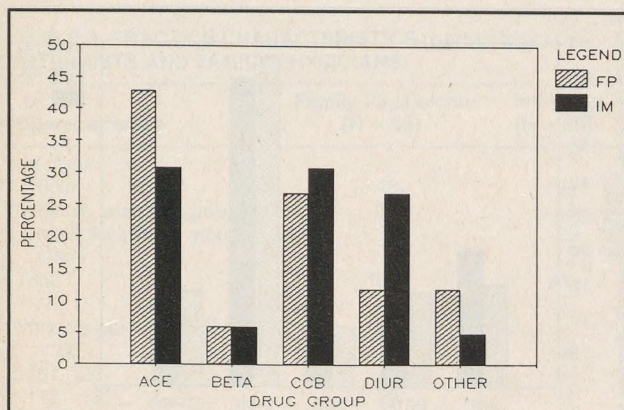
Figure 1 displays the percentage of each response for the question concerning treating a young white woman. Chi-square testing revealed that there was no significant difference between specialties. It is interesting to note the high frequency of responses for diuretics. The majority of responses for "other" were for combinations of hydrochlorothiazide and triamterene.

Figure 2 displays the responses for an elderly woman. Although the majority of physicians chose a diuretic, 10% to 20% of physicians selected  $\beta$ -blockers, ACE inhibitors, or calcium channel blockers. Again, the majority of responses for "other" were for hydrochlorothiazide-triamterene combinations. Figure 3 displays the results for a middle-aged black man with insulin-dependent diabetes. There were no significant differences between physician groups using chi-square analysis. The prescribing patterns for a 58-year-old obese white woman with diabetes and renal impairment are shown in Figure 4. For this example there were statistically significant differences between the family physicians and internists ( $P = .036$ ). Family physicians were more likely than internists to select an ACE inhibitor or a  $\beta$ -blocker rather than a diuretic.

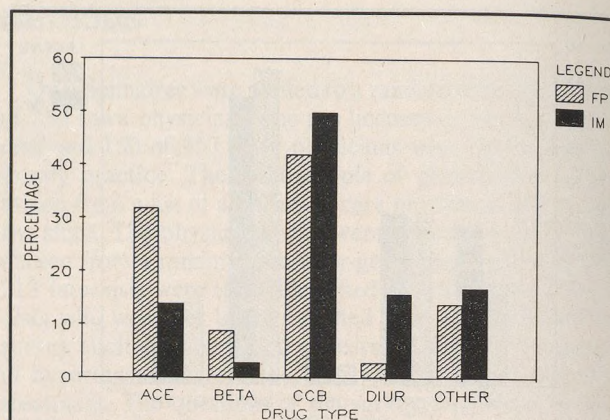
DISCUSSION

This study demonstrates that these physicians frequently prescribe antihypertensive drugs based upon patient age, race, and coexisting disease. The results are also consistent with the current trend toward individualizing drug selection for hypertensive patients. The present study did not find major differences in antihypertensive drug selection





**Figure 3. Responses for a 45-year-old black man with insulin-dependent diabetes. Abbreviations are the same as in Figure 1**



**Figure 4. Responses for a 58-year-old obese white woman with non-insulin-dependent diabetes and impaired renal function. Abbreviations are the same as in Figure 1**

when family physicians and internists were compared.

These results are in contrast to the findings of three studies published in 1986 in which the vast majority of physicians prescribed diuretics.<sup>9-11</sup> A survey conducted by the Gallup Organization<sup>11</sup> found that diuretics were more likely to be prescribed by physicians who had more years in practice, internists (compared with general practitioners), those who perceived cost to be a hardship to their patients, and those who followed the Joint National Commission's 1984 guidelines. Both Gallup and Cotugno<sup>11</sup> and Ray and colleagues,<sup>10</sup> however, found that after 1983, physician attitudes were changing. Both studies found that physicians were beginning to use  $\beta$ -blockers, calcium channel blockers, and ACE inhibitors more liberally, but these drugs were still used much less than diuretics.

Two of the above studies<sup>9,11</sup> asked physicians what they would select for initial step 1 therapy, and the study by Ray et al<sup>10</sup> examined the frequency of use of antihypertensive drugs from the Michigan and Tennessee Medicaid programs. These studies did not examine specific patient characteristics that may influence the treatment decision. The present study instrument differed from previous questionnaires that examined antihypertensive prescribing characteristics because it provided brief patient summaries and asked the physician to select a specific drug for each patient. This provided some indication of the extent to which physicians might individualize therapy for the specific patient.

Young patients frequently have normal peripheral vascular resistance, high cardiac output, and elevated renin.<sup>2,15</sup> They are also more likely to respond to a  $\beta$ -blocker or an ACE inhibitor.<sup>6,16</sup> As anticipated, therefore, 60% of family physicians and 80% of internists chose one of these agents for the patient under 40 years of age (Table 2). It is

interesting to note that one fourth of the physicians (33% of family physicians and 19% of internists) selected a diuretic for his patient, and when asked about a 32-year-old white woman (Figure 1), 44% selected a diuretic. Apparently the physicians who chose a diuretic continue to follow traditional stepped-care therapy.

Black patients responded better to diuretics or calcium channel blockers in some studies.<sup>2,17</sup> It was therefore expected that these two classes would be selected for a black patient. When given the example of the black patient with insulin-dependent diabetes mellitus (Figure 3), it was anticipated that diuretics would be avoided because of potential adverse effects on diabetes control.<sup>18</sup> Nevertheless, 20% still chose a diuretic, a decision that may reflect experience, previous stepped-care recommendations, or the advocacy of diuretics by the Working Group on Hypertension in Diabetes.<sup>19</sup> The finding that 36% of physicians would select an ACE inhibitor in the case of this latter patient was not anticipated. One possible explanation is that these physicians were considering the recent evidence that captopril slows the progression of diabetic nephropathy in patients with renal disease.<sup>20,21</sup> This property, however, may not be unique to captopril or the ACE inhibitors.<sup>22</sup>

These physicians responded that they would prescribe a calcium channel blocker or an ACE inhibitor for 76% and 80% of patients with diabetes and hyperlipidemia, respectively. This finding is consistent with the concerns that diuretics and  $\beta$ -blockers can elevate blood glucose and plasma lipid values.<sup>23-27</sup> A significant number of practitioners remain, however, who are not aware of or who are not concerned by potential adverse effects of  $\beta$ -blockers or



diuretics in these patient populations.

In many instances, an antihypertensive medication can be used to treat more than one disease. This approach is generally more convenient and less costly. The use of an antihypertensive drug that also treats coexisting disease is reflected by the finding that 93% of physicians selected a  $\beta$ -blocker or calcium channel blocker for a patient with angina. In addition, 92% chose an ACE inhibitor or a diuretic for a patient with congestive heart failure.

There are limitations to a questionnaire in which the physician has limited information in which to make a decision. Responses might have been different had more patient information been available or had the physician been able to prioritize treatment options. It is not known what influence the response rate may have had upon the results. Theoretically, the respondents may have been more motivated and aware of recent trends and recommendations in the field of hypertension than nonrespondents. It is not certain, therefore, that these results reflect prescribing by all internists or family physicians.

This study demonstrates that the majority of family physicians and internists who responded to this questionnaire individualize their choice of antihypertensive medication to the specific patient and consider factors such as age, race, and coexisting disease. There were only minor differences in the prescribing patterns of family physicians and internists. The 1988 treatment guidelines recommended diuretics,  $\beta$ -blockers, ACE inhibitors, and calcium channel blockers as acceptable step 1 agents.<sup>12</sup> The prescribing philosophies observed in the present study were determined before the publication of the 1988 report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure. Physicians may individualize antihypertensive therapy even more than observed by the present study once these recommendations become widely disseminated.

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**APPENDIX**

**Questionnaire Sent to Internists and Family Practice Physicians in Iowa Concerning Prescription Choices for Hypertensive Patients**

1. If you decide to treat hypertension with drugs, which one drug class do you usually use as initial therapy for patients with the following characteristics? (Please choose one drug for each characteristic.)

Characteristic	$\beta$ -Blocker	Calcium Channel Blocker*	ACE Inhibitor†	Diuretic‡
Age <40 years	_____	_____	_____	_____
Black	_____	_____	_____	_____
Female	_____	_____	_____	_____
Low income	_____	_____	_____	_____
Diabetic	_____	_____	_____	_____
Hyperlipidemia	_____	_____	_____	_____
Angina/CAD§	_____	_____	_____	_____
Congestive heart failure	_____	_____	_____	_____
Renal disease	_____	_____	_____	_____

2. Assume that the following patients have no other health problems and that you have decided to begin pharmacologic treatment for their hypertension. What would be your first choice of therapy?

32-year-old white woman

Drug name \_\_\_\_\_ mg/d \_\_\_\_\_

60-year-old white woman

Drug name \_\_\_\_\_ mg/d \_\_\_\_\_

45-year-old black man who has insulin-dependent diabetes

Drug name \_\_\_\_\_ mg/d \_\_\_\_\_

58-year-old obese white woman who has non-insulin-dependent diabetes with a creatinine clearance of 30 mL/min.

Drug name \_\_\_\_\_ mg/d \_\_\_\_\_

\* For example, diltiazem, nifedipine, verapamil

† For example, captopril, enalapril

‡ For example, thiazide or loop diuretics

§ Coronary artery disease