Pharmacologic Management of Heart Failure Among Older Adults by Office-Based Physicians in the United States

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BACKGROUND. Despite the recent availability of new classes of heart failure medications, little is known about national patterns in the actual physician utilization of these drugs.

METHODS. In the National Ambulatory Medical Care Survey, 2912 US physicians reported on 16,968 office visits in 1991-1992 with patients aged ≥ 65 years. National estimates were obtained from weighted results that accounted for the complex sampling design.

RESULTS. An estimated 8.3 million (2.6%) office visits with older adults involved heart failure. This included 9.3% of visits to cardiologists, 4.3% to internists, 3.5% to general and family physicians, and 0.6% to other physicians. The most frequently prescribed medications during visits with these patients were diuretics (69%), digitalis compounds (46%), angiotensin-converting enzyme inhibitors (30%), and nitrates (19%). Internists and general and family physicians prescribed angiotensin-converting enzyme inhibitors, digitalis compounds, and loop diuretics for patients with heart failure less often than did cardiologists.

CONCLUSIONS. These are the first national surveillance estimates of physician practices in the management of heart failure. These data were collected during the same period in which heart failure clinical trial results were initially published, and they provide a baseline for monitoring the influence of recent clinical practice guidelines and professional education on changes in the management of heart failure by primary care physicians.

KEY WORDS. Aged; angiotensin-converting enzyme inhibitors; antihypertensive agents; epidemiology; heart failure. *(J Fam Pract 1997; 44:382-390)*

Heart failure is a major health problem among older adults.[1] Traditional therapeutic approaches involve counteracting compensatory mechanisms of the pathophysiology of heart failure rather than reversing specific defects in dysfunctional myocardium.[2,3] Although information is available regarding recent trends in the pharmacologic management of hypertension[4-7] and myocardial infarction,[8-10] little is known about drug utilization patterns for heart failure in the United States. For several decades, heart failure research has focused on the

therapeutic benefits of vasodilators.[11,12] In 1986, Hlatky et al[13] assessed whether changes in the understanding and treatment of heart failure had been accepted into clinical practice. Survey results showed that most physicians considered diuretics to be first-line therapy for heart failure. Furthermore, physicians reported using vasodilators in addition to digitalis and diuretics as therapeutic options for heart failure; the most commonly used vasodilators, in order of physician preference, were nitrates, captopril, hydralazine, and prazosin.[13]

Clinical trials conducted during the past decade assessed the impact of various drug treatments on the management of heart failure among patients with a left-ventricular ejection fraction ≤45%.[14,15] The clinical trials demonstrated improved survival with therapies that included angiotensin-converting enzyme (ACE) inhibitors, hydralazine, and isosorbide dinitrate.[16-19] Several studies found, however,

that other treatment strategies for patients with advanced symptoms provided symptomatic benefit but may have impaired survival.[20-22]

Little is known about the actual pharmacologic management practices for heart failure at the time that these clinical trial results were published. The National Ambulatory Medical Care Survey (NAMCS) is the only national surveillance system that examines the drug-prescribing patterns of office-based physicians. Survey years 1991 and 1992 represent the most recent data available for analysis of these patterns. Thus, the NAMCS affords the opportunity to expand our understanding of physician drug utilization patterns during and immediately following initial publications of clinical trial results. This study also provides insight into the characteristics of physician encounters with older patients who have heart failure.

METHODS

The NAMCS is designed and conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention; data are collected by the US Bureau of the Census. The three-stage probability sampling procedure, sampling variance, and estimation procedures for the NAMCS have been described elsewhere.[23-26] The basic sampling unit is the physician-patient encounter. In brief, names of office-based physicians (defined as nonfederally employed physicians principally engaged in patient care activities in the office) were selected in 1991 (2540 physicians) and 1992 (3000 physicians) from master files of the American Medical Association and American Osteopathic Association in 112 primary sampling units (ie, counties, groups of counties, townships, or standard metropolitan statistical areas). Physicians were excluded for retirement, death, or employment in teaching, research, or administration. The total physician sample was divided into 52 random subsamples and randomly assigned to 1 week in the survey year. During the assigned week, the physician selected a systematic random sample of patient visits to assess for the survey.

There were 33,795 patient records completed by 1354 (72%) of 1887 eligible physicians in 1991, and 34,606 records completed by 1558 (73%) of 2142 eligible physicians in 1992. This study is limited to 16,968 office visits of patients aged $\geq$ 65 years.

Physician specialities were grouped as cardiology (n=1273 visits), which included cardiovascular disease surgeons; internal medicine (n=2004); general and family practice (n=2522); and all other specialists and surgeons (n=11,169).

After receiving instructions from a field representative, the physician and office staff recorded information on patient characteristics (date of birth, sex, and race); expected sources of payment; up to three reasons, complaints, or symptoms given by the patient for the visit; a subjective assessment of depression, hypertension, hypercholesterolemia, or obesity; a maximum of three diagnoses; the provision of selected diagnostic or screening procedures, selected patient education, counseling or other therapeutic services; and a maximum of five medications.

Physicians were instructed to record specific brand or generic names for all new and continued medications that they prescribed, injected, administered, or provided during the visit. Both brand and generic code numbers were assigned from the National Drug Code Directory, 1982 edition.[27] Drugs were grouped into classes of antihypertensive agents in the manner described by Manolio et al[4]: diuretics, ACE inhibitors, beta blockers, and calcium antagonists. A fifth category for other antihypertensives included hydralazine, reserpine, other vasodilators, and central-acting agents. We also defined specific classes of drugs to include other medications commonly used for heart failure, including digitalis compounds, nitrates, and aspirin. The generic drugs included in these classes are described by Konstam et al.[28] For some analyses, diuretics were further classified as thiazide, loop, and potassium-sparing. A maximum of five ingredients were coded for each combination drug. We counted combination drugs once for each drug class (eg, a combination drug containing both captopril and hydrochlorothiazide as ingredients was counted as both an ACE inhibitor and a diuretic).

The *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM), Third Edition*[29] was used to code diagnoses. Heart failure was defined if the record included ICD-9-CM diagnosis codes 428-428.9, 402.01, 402.11, 402.91, 404.01, 404.03, 404.11, 404.13, 404.91, or 404.93. To ascertain whether physicians were prescribing the selected antihypertensive medications to anyone during this period, we included as another compari-

TABLE 1

Patient Characteristics Among Adults Aged ≥65 Years, Examined in Office-Based Visits, by Heart Failure and Hypertension Status: National Ambulatory Medical Care Survey, 1991-1992

Patient Characteristic	Heart Failure, % (n=352)	Hypertension with No Diagnosis of Heart Failure, % (n=4590)	No Report of Hypertension or Heart Failure, % (n=12,026)
Aged ≥85 years	26.8	8.8	8.5
Women	60.6	65.6	57.1
White	91.8	85.7	93.5
Black	6.1*	11.3	4.5
Other	2.1*	3.0	2.0
Hispanic origin	4.7*	4.5	4.4
Depressed†	8.6	7.8	6.2
Obese†	9.8	16.8	5.8
Hypercholesterolemic†	12.5	22.1	5.8

*Unstable estimates. Relative standard error is greater than 30%.

†By physician assessment of the patient.

NOTE: The national estimate of numbers of office visits: for heart failure, 8,341,886; for hypertension with no diagnosis of heart failure, 102,976,634; visits with no report of hypertension or heart failure, 212,518,519.

son group adults with hypertension but no evidence of heart failure. Hypertension was defined if it was reported as part of the assessment, as one of the symptoms or reasons for the office visit, or as an ICD-9-CM diagnosis code 401.0-405.99. Thus, all office visits were classified as either (1) heart failure regardless of hypertension status, (2) hypertension with no diagnosis of heart failure, or (3) no report of either disease.

Frequencies of characteristics and drug classes by heart failure status and physician specialty were weighted to take into account selection probability, nonresponse, and the physician-population weighting ratio adjustment. The National Center for Health Statistics considers an estimate to be unreliable if the relative standard error exceeds 30%[23,24]; these unstable national estimates are indicated by asterisks on the tables and figures.

RESULTS

Patients aged 65 years or older made an estimated 323,837,039 office visits in 1991-1992. Among these office visits, 2.6% had diagnosis codes for heart failure. This yields a national estimate of 8,341,886 office visits of older patients with heart failure during the 2-year period. The prevalence of heart fail-

ure cases encountered during office visits with older patients varied according to physician specialty: 9.3% among cardiologists, 4.3% among internists, 3.5% among general and family physicians, and 0.6% among other physicians. Among office visit records that had a diagnosis code for heart failure, 38.2% also mentioned hypertension. Hypertension without evidence of heart failure was reported for 31.8% of office visits involving older patients (43.8% of visits to cardiologists, 46.2% to internists, 43.0% to general and family physicians, and 18.7% to other physicians).

Patient characteristics varied according to their heart failure and hypertension status (Table 1). Patients with heart failure comprised a much higher percentage of people who were aged 85 years or older than either patients with hypertension only or patients with no mention of either condition. Patients with heart failure were also somewhat more likely to be assessed as depressed by the physician. Among patients with heart failure and patients with hypertension only, there were greater percentages of women and higher prevalences of obesity and hypercholesterolemia than among patients without evidence of either condition.

Characteristics of the physician-patient encounter also varied with heart failure and hypertension status (Table 2). Patients with heart failure were less likely to have been referred by another physician and were more likely to have seen their physician previously, especially for the same diagnosis. The government was more likely to be expected to be the source of payment for patients with heart failure than for those patients with hypertension only or those with no evidence of either condition. Visits of patients with heart failure and patients with hypertension only were more likely to include patient education or counseling concerning cholesterol reduction, diet, exercise, and weight reduction.

Few of these older patients received counseling regarding smoking cessation.

As expected, the rate of prescription of most medication classes commonly used to treat hypertension or heart failure or both was higher for visits of patients with heart failure in contrast to visits that indicated hypertension with no evidence of heart failure and visits with no evidence of either condition on the record form (Figure 1). Among visits of patients with a diagnosis of heart failure, diuretics were mentioned in 69.4% of visits, digitalis compounds in 45.8%, ACE inhibitors in 29.6%, nitrates in 19.3%, calcium antagonists in 16.1%, beta blockers in 6.8%, and other antihypertensive medications in 2.3%. Aspirin was indicated on the patient record for 5.5% of visits by patients with heart failure; there was evidence that aspirin was prescribed for arthritis pain relief in only two cases. Among visits of patients with a diagnosis of heart failure, fewer than 10% included new prescriptions. There was no mention of any antihypertensive medication (diuretics, ACE inhibitors, beta blockers, calcium antagonists, and other antihypertensive drugs) for 20.4% of the patients with heart failure, 45.4% of the patients with hypertension and no diagnosis of heart failure, and 86.7% of the patients who had neither condition.

Drug utilization for patients with heart failure varied by clinical specialty (Figure 2). Because of the small numbers of patients with heart failure in the survey sample, many national estimates that may be unstable are indicated on the figure. Cardiologists reported a higher prevalence of use of digitalis compounds, ACE inhibitors, and loop diuretics in patients with heart failure than did internists and general or family physicians. While there was an overall prevalence of 30% for use of ACE inhibitors among all physician visits that involved older adults with heart failure, this drug was mentioned during at

least 55% of the visits to cardiologists by patients with heart failure.

TABLE 2

Characteristics of the Physician-Patient Encounter Among Adults Aged ≥ 65 Years, Examined in Office-Based Visits, by Heart Failure and Hypertension Status: National Ambulatory Medical Care Survey, 1991-1992

Characteristic	Heart Failure, %	Hypertension with No Diagnosis of Heart Failure, %	No Report of Hypertension or Heart Failure, %
Visit not a referral	98.5	96.1	92.4
Ever saw patient before	94.8	92.6	87.6
Ever saw patient before for same diagnosis	85.5	77.4	72.3
Government (including Medicare and Medicaid) expected to be source of payment	88.7	84.0	80.7
Patient counseling			
Diet	28.5	23.3	7.7
Exercise	11.2	12.2	5.5
Cholesterol reduction	6.6*	10.3	2.3
Weight reduction	6.5*	8.6	1.6
Smoking cessation	1.1*	2.0	1.4

*Unstable estimate. Relative standard error is greater than 30%.

DISCUSSION

In 1994, the Agency for Health Care Policy and Research (AHCPR) sponsored the development of clinical practice guidelines for the evaluation and care of patients with heart failure with left-ventricular systolic dysfunction (Table 3).[28,30] The AHCPR guidelines recommended that ACE inhibitors be given to all patients with heart failure with left-ventricular systolic dysfunction unless specific contraindications existed.[28,30] Patients with heart failure with signs of significant volume overload should be started with a diuretic: thiazide diuretics for mild overload and loop diuretics for severe overload. The continuum of recommended therapy ranges from the use of an ACE inhibitor alone for mild manifestations, to the use of an ACE inhibitor, digoxin, a combination of diuretics, and hydralazine hydrochloride or isosorbide dinitrate for patients with heart failure with more severe manifestions.[30] Long-acting nitrates and aspirin are among the rec-

ommended treatments for patients who have persistent heart failure and angina but who are not revascularization candidates. Finally, the guidelines cautioned that beta blockers and first-generation calcium antagonists may have negative inotropic effects.[28,30] Similar heart failure guidelines were released in 1995 by a joint task force of the American College of Cardiology and the American Heart Association (ACC/AHA).[31] The NAMCS data for 1991-1992 show that US physicians were already using many of these drugs before publication of these guidelines.

To our knowledge, there were no national clinical practice guidelines for the treatment of heart failure before 1994. Table 4 presents an outline of the drug classes that were recommended in 1987 for the pharmacologic management of congestive heart failure in clinical practice.[32] Depending on the severity in any individual patient, the treatment of the heart failure state was often divided into three categories: (1) enhancement of myocardial contractility with digitalis compounds; (2) control of excessive salt and water retention with diuretics; and (3) reduction of cardiac workload, including afterload with vasodilators.[32] Although vasodilators such as hydralazine, minoxidil, captopril, enalapril, alpha

blockers, and nitrates were demonstrated to be useful by 1987, only captopril had been approved for treatment of heart failure in the United States.[32]
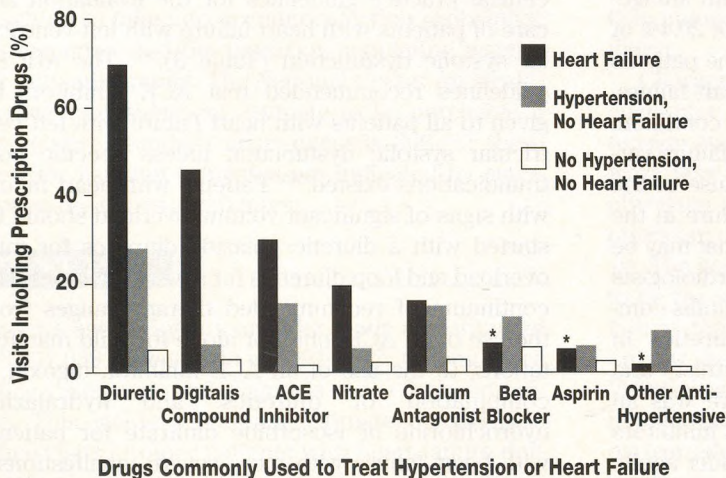
Three important differences distinguish current guidelines from earlier conventional practice. First, "congestive" has been dropped from the diagnostic term in recognition that asymptomatic patients with left-ventricular dysfunction will also benefit from therapeutic management.[15] Second, diagnosis and treatment of heart failure is based on measurements of the ejection fraction rather than traditional signs and symptoms.[15,28,30,31] AHCPR heart failure guidelines address treatment only in patients with left-ventricular systolic dysfunction (ie, an ejection fraction ≤40%).[28,30] ACC/AHA guidelines,[31] however, also describe important differences in the drug therapy for patients with left-ventricular diastolic dysfunction (ie, a normal ejection fraction but clinical evidence of pulmonary venous hypertension and congestion). Finally, the new guidelines are distinguished by the emergence of ACE inhibitors as the preferred initial therapy for the pharmacologic management of heart failure in clinical practice.[11]

The current results demonstrate that US physicians in 1991-1992 regarded diuretics as the major therapy for heart failure. During office visits with patients with heart failure, the most frequently prescribed heart failure medications were diuretics (69%), digitalis compounds (46%), and ACE inhibitors (30%). These results are similar to findings of Hlatky et al,[13] who reported in 1986 that physicians preferred diuretics (83%), digitalis (37%), and any vasodilating agent (9%) as part of the initial therapy for their patients with heart failure. The much greater prevalence of ACE inhibitors in 1991-1992 than in the study by Hlatky et al probably reflects not only the greater availability of this class of drugs during the last decade but also overall changes in the use of specific antihypertensive medications.

The 1988 Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC IV)[33] recom-

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Figure 1

Proportion of office visits with patients aged ≥ 65 years that involved prescriptions for drugs commonly used to treat either hypertension or heart failure, by heart failure and hypertension status: National Ambulatory Medical Care Survey, 1991-1992. Unstable estimates that have a relative standard error greater than 30% are identified with an asterisk (*).

Legend:
- Heart Failure
- Hypertension, No Heart Failure
- No Hypertension, No Heart Failure

Y-axis: Visits Involving Prescription Drugs (%)

X-axis: Drugs Commonly Used to Treat Hypertension or Heart Failure — Diuretic, Digitalis Compound, ACE Inhibitor, Nitrate, Calcium Antagonist, Beta Blocker, Aspirin, Other Anti-Hypertensive

mended using either a diuretic, beta blocker, calcium antagonist, or ACE inhibitor as the first step of pharmacologic therapy for hypertension. Trends in hypertension management demonstrate that use of ACE inhibitors and calcium antagonists increased dramatically during the last decade with a concomitant decrease in the use of less expensive diuretics, beta blockers, and vasodilators.[4,5] Psaty et al[5] speculated that these trends reflected the influence of the major hypertension clinical trial results on clinical practice; however, during that time only diuretics and beta blockers had been shown to reduce cardiovascular disease morbidity and mortality in hypertension clinical trials.[34] Indeed, recent JNC V recommendations suggest thiazide diuretics and beta blockers as the two classes of drugs preferred for the initial drug therapy for hypertension.[35]

While patients with heart failure in the NAMCS shared many similarities with older patients who had hypertension only, there were several differences between the two groups. More than one fourth of patients with heart failure, compared with 8% of patients with hypertension, were aged 85 years or older. While this proportion of very elderly patients with heart failure may seem high in contrast to clinical trial study populations, this national estimate is similar to the proportions of adults aged 85 years or older among Medicare patients with an initial hospitalization for heart failure in 1993 (22% of 67,700 black patients with heart failure and 27% of 735,806 white patients with heart failure).[36] Unlike results often reported for study populations in the literature, these national estimates demonstrate the heterogeneity of characteristics among patients with heart failure seen in actual clinical practice in contrast to the homogeneous characteristics of patients selected for heart failure clinical trials. Possibly reflecting this greater proportion of much older ages in the heart failure group and the likelihood that fewer private resources remained for this older group, the government was expected to be the source of payment for almost 90% of office visits

of patients with heart failure in contrast to 84% of hypertensive patients with no mention of heart failure.

Because the physician had seen the patient before for the same diagnosis in almost 86% of encounters with patients with heart failure, these results also demonstrate that the office visits of patients with heart failure are substantially more likely to represent a continuity of care than the office visits of older patients who have neither hypertension nor heart failure. Furthermore, there were new antihypertension prescriptions in fewer than 10% of the visits of patients with heart failure.

ACE inhibitors were also more likely to be prescribed for patients with heart failure than for patients with hypertension only. Given the potential benefits of ACE inhibitors in the pharmacologic management of heart failure, however, the prevalence of ACE inhibitor use in 1991-1992 was low. Nevertheless, prevalences of ACE inhibitor use among 30% of patients with heart failure and among 15% of patients with hypertension but with no evidence of heart failure in the 1991-1992 NAMCS are consistent with trends for management of myocardial infarction and hypertension. Regional preva-

Figure 2

Proportion of office visits with patients aged ≥ 65 years with heart failure that involved prescriptions for selected drugs commonly used to treat either hypertension or heart failure, by physician speciality: National Ambulatory Medical Care Survey, 1991-1992. Unstable estimates that have a relative standard error greater than 30% are identified with an asterisk (*).
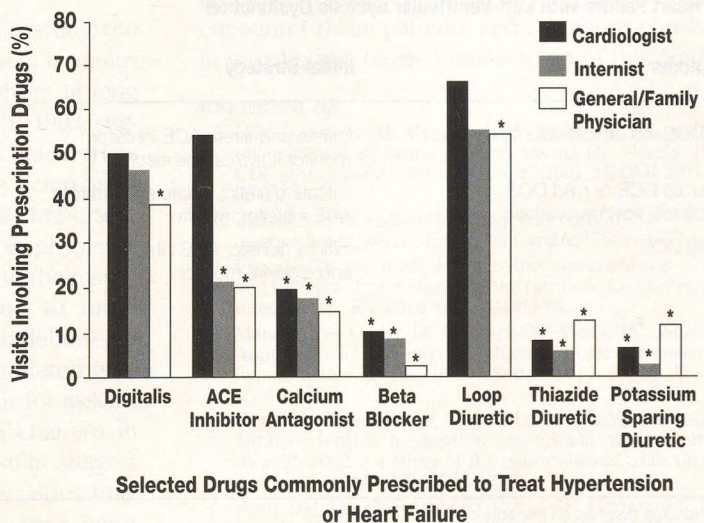
lences of ACE inhibitor use ranged between 18% and 23% in 1990-1993 among patients hospitalized for acute myocardial infarction in 6306 US hospitals.[10] Trends based on data from the National Disease and Therapeutic Index show that ACE inhibitors accounted for 0.8% of all hypertensive drug mentions in 1982 and increased to 24% by 1993.[4] In a cohort of adults aged ≥ 65 years who were selected from four US communities, about 14% of those who had a reported history of hypertension were taking ACE inhibitors in 1990[6]; the prevalence of ACE inhibitor use among persons beginning to take antihypertensive medications ranged between 23% and 26% during 1989-1992 in this cohort.[5] Use of ACE inhibitors was high among NAMCS cardiologists treating patients with heart failure (55%); this is similar to ACE inhibitor use by 58% of patients with heart failure in a 1993 cardiology clinic-based study.[37]

The NAMCS results show that an estimated 4 million office visits of patients with heart failure occurred each year. Cardiologists, internists, general practitioners, and family physicians were more likely than other physicians to encounter older adults with heart failure during office visits. It has been estimated that primary care physicians account for 78% of the clinic visits of patients with heart failure, while cardiologists represent only 18% of these visits.[38] The use of ACE inhibitors, digitalis compounds, and loop diuretics was lower among internists and general and family physicians than among cardiologists.

This study is limited by the sample size of office visits for heart failure in the NAMCS, which may be too small to provide stable estimates of the utilization of some drug classes by clinical specialty. A second limitation includes the lack of information regarding duration and severity of heart failure cases. Cardiologists may be more likely than other physicians to encounter more severe stages of heart failure that require more aggressive drug therapy. They may also be more familiar with recent literature on heart failure, clinical trial results, and clinical practice guidelines. Furthermore, noncardiologists may be more reluctant to use ACE inhibitors because two widely publicized studies in 1985 and 1986 reported renal dysfunction and severe hypotension with the use of large doses of ACE inhibitors among severely ill patients.[39-41] Although general practitioners and internists were undersampled in 1992,[25] specialty-specific prevalences did not differ between 1991 and 1992. Thus, differences among specialties cannot be explained by this undersampling.

It is possible that lower prescription prevalence estimates observed during the surveyed encounter among internists and general and family physicians reflect prescriptions at previous encounters if primary care physicians see patients with heart failure

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TABLE 3

Agency for Health Care Policy and Research (1994) Clinical Practice Guidelines for the Pharmacologic Management of Patients with Heart Failure with Left-Ventricular Systolic Dysfunction

Symptoms	Initial Strategy	If Symptoms Not Resolved
Mild DOE, no clinical volume overload	Initiate and titrate ACE inhibitor; monitor if symptoms resolve	Add diuretic (if not resolved, follow next step)
Moderate DOE or mild DOE with clinical volume overload	Inititate diuretic; initiate and titrate ACE inhibitor; monitor	Add digoxin (if not resolved, follow next step)
Severe DOE	Initiate diuretic, ACE inhibitor, and digoxin; monitor	Aggressive diuretic therapy for persistent volume overload
		Hydralazine and/or nitrates for persistent dyspnea
		Direct vasodilator or alpha blocker for persistent hypertension
		Nitrates and aspirin for concomitant angina

DOE denotes dyspnea on exertion.

more frequently than do cardiologists. Furthermore, this limitation of the NAMCS study design may result in an overall underestimate of the total prescription prevalences of antihypertension medications. Nevertheless, these findings represent the only nationally representative data to examine differences between clinical specialties in the pharmacologic management of heart failure. Furthermore, this difference in prescribing patterns between specialties is supported by consumer research data.[38]

Other limitations of the NAMCS data should be considered in the interpretation of these results. Over 2.6% of all office visits of older patients and 3.5% of office visit encounters between older patients and a general or family physician involved heart failure. Unfortunately, because of the complex sampling design of the NAMCS, we cannot infer that these findings translate into a prevalence of 2.6% of all older adults being diagnosed with heart failure. This estimate is remarkably similar, however, to rates for an initial hospital admission with heart failure as a diagnosis among the 1993 Medicare population, aged ≥65 years.[36] If physicians had poor reliability for recording chronic and recurring conditions seen on repeated visits,[42] cases of heart failure and hypertension may be underrepresented in this survey because the NAMCS relies on chart diagnoses rather than standardized measurements of left ventricular ejection fractions and blood pressure levels. Finally, the NAMCS provides no information regarding dosage, compliance, or history of adverse effects that might influence the physician's choice of drug class.[43]

Despite the potential limitations of this study, the results have important implications. First, it is apparent that the overall use of ACE inhibitors among patients with heart failure was low in 1991-1992, suggesting that the results of heart failure clinical trials may not yet have made an impact on physician practices. Nevertheless, these data provide important baseline levels for monitoring changes in physician response to the 1994 clinical guidelines, to the resulting professional education efforts, and to more recent clinical trial results. If these pre-guideline estimates are not taken into account, an inflated estimate of the "effect size" is likely to occur for assessing the impact of these influences on changes in physician practices.[44] Second, these results suggest that physicians in different clinical specialties may use different classes of medications to treat heart

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TABLE 4

Drug Classes Recommended for the Pharmacologic Management of Congestive Heart Failure Prior to Publication in 1994 of the Agency for Health Care Policy and Research Clinical Practice Guidelines

Treatment Strategies	Drug Classes Recommended*
Improve myocardial contractility	Digitalis compounds
Control excessive fluid retention	Thiazide diuretics
	Metolazone (thiazide-related)
	Loop diuretics
	Potassium-sparing diuretics
Reduce afterload	Hydralazine†
	Minoxidil†
	ACE inhibitors (captopril, enalapril)†
	Alpha blockers (prazosin, phentolamine)†
	Nitrates (nitroglycerin, isosorbide dinitrate)†

*From Braunwald.[32]
†Demonstrated to be useful, but only captopril had been approved for heart failure treatment in the US prior to publication in 1987.[32]

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failure. This suggests a need for further monitoring of physician practices. Educational initiatives are needed to ensure that clinical practice guidelines for the evaluation and care of patients with heart failure are followed appropriately by all physicians who encounter these patients and to ensure consistency in the pharmacologic management of this condition.

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