TREATMENT DIFFERENCES FOR AMBULATORY HYPERTENSIVE PATIENTS SEEN IN OFFICE-BASED SETTINGS

By

Linda S. Hughes

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ABSTRACT

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Cardiovascular disease is the leading cause of death for Americans and hypertension is a major risk factor for it. Despite this, fewer than one-fourth of all hypertensive persons control their blood pressure. Two purposes of the current study are: to determine whether appropriate interventions are being ordered, and to determine what conditions are associated with giving adequate treatment for hypertension.

Data for this investigation came from the 1992 National Ambulatory Medical Care Survey of patients seen by office-based physicians and practitioners.

A very significant finding was that only one-fifth of newly diagnosed hypertensive patients got even one non-pharmacological treatment. Only 85.5 percent of these hypertensive patients got any treatment or follow-up, including medications.

For non-pharmacological treatments, obese patients were three times as likely as others to receive it, Hispanics only one-third as likely. After combining all treatments and follow-up into a single category of "intervention", however, the differences disappeared.

ACKNOWLEDGEMENTS

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INTRODUCTION

In 1995, cardiovascular disease was the leading cause of death for Americans, according to the Center for Disease Control (1995), and hypertension is a major risk factor in most cardiovascular diseases (editors, American Journal of Public Health, 1994). Diseases caused by hypertension include stroke, ischemic heart disease, congestive heart failure and renal failure (MacMahon, Petro, and Cutler, 1990 and Collins, Petro, and MacMahon, 1990).

Hypertension remains the most prevalent, yet medically treatable, chronic condition among adult Americans. Nearly 50 million people, or more than twenty five percent of the adult United States population, are affected by hypertension (The Fifth report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure [JNC], 1993).

Hypertension is one of the commonest reasons for visits to family physicians. Left untreated, it and its sequelae can lead to serious morbidity and mortality, according to Kligman (1993). Although usually silent, hypertension may present with fatigue, occipital and pulsating headaches in the early morning, lightheadedness,

flushing, epistaxis, chest pains, visual and speech disturbances and dyspnea. Without treatment, 70 percent of hypertensive patients die of congestive heart failure or coronary heart disease, 15 percent die of cerebral hemorrhage and 10 percent die of uremia (Blake, 1994).

Despite the risks of high blood pressure, national data indicate that fewer than 25 percent of all hypertensive persons currently meet the recommended blood pressure goal of less than 140/90 mm Hg. (JNC, 1993)

The gap between the potential to control blood pressure and its achievement was recognized soon after effective hypotensive agents became readily available (Creditor and Schoenberger, 1972). Since then, a consistent pattern of high rates of patient dropout and failed therapy has been widely documented (Stockwell, 1994). Despite great technical advances, specifically, the development of a wide range of new antihypertensive drugs and drug classes, the process of care available in the community has not changed to any great extent, and treatment itself remains highly ineffective, according to Stockwell.

The Fifth Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure (JNC) outlines currently accepted treatment protocols for managing the care of hypertensive patients. This report was derived from solid scientific evidence accumulated over

two decades through research under the auspices of the National Institutes of Health (NIH). The JNC was established in 1976 by the National High Blood Pressure Education Program of the National Heart, Lung, and Blood Institute of the NIH to provide concise, clinically relevant consensus guidelines on the detection and treatment of hypertension. The resulting documents are authored by clinical hypertension experts and public health specialists who develop a consensus on hypertension management that integrates their differing viewpoints (Roccella, 1992.)

Each JNC publication is triggered by the release of significant hypertension research results and is, therefore, built on a strong foundation of clinical experience. Each publication is also endorsed by the Coordinating Committee, a body of professional and voluntary organizations that includes the American Academy of Family Physicians, the American Academy of Cardiology, American College of Chest Physicians, American College of Physicians, American Diabetes Association, American Dietetic Association, American Heart Association, American Hospital Association, American Medical Association, American Nurses' Association, American Osteopathic Association, American Pharaceutical Association, American Public Health Association, American Red Cross, American Society of Hypertension, and many other prominent health

organizations. This coordinating committee also includes eight federal agencies: The Agency for Health Care Policy and Research, Health Care Financing Administration, Health Resources and Services Administration, National Center for Health Statistics, Centers for Disease Control, National Heart, Lung and Blood Institute, National Institute of Diabetes and Digestive and Kidney Diseases, and Veterans Affairs.

The current study will concern itself with "appropriate" treatment. Because it is nurse-practitioner-oriented, not a medical or pharmacological study, it will focus mainly on non-pharmacological treatments for hypertension. According to the JNC, non-pharmacological treatments of hypertension are always appropriate, whereas the appropriateness of pharmacological treatments would vary according to many factors which were not reported on this survey (exact blood pressures, patient history, any prior treatments and responses to such treatment, physical condition, complications, comorbid conditions, etc.)

Data for this investigation came from the 1992 National Ambulatory Medical Care Survey (issued in October, 1995). This survey was conducted throughout the entire year, 1992, by the National Center for Health Statistics (NCHC). The survey provides data from samples of records of medical care given to patients seen by office-based physicians and practitioners. The basic sampling unit is

the physician-patient encounter or visit. The physicians included in the study were sampled from a list of providers classified by the American Medical Association or the American Osteopathic Association as those giving office-based care.

In this study, the types of treatment offered to the newly-diagnosed hypertensive patients will be examined.

Given the problems of failure to implement known, effective therapies, the current study is an attempt to determine whether or not appropriate interventions are being used with hypertensive patients in the United States, and what factors are associated with the use of appropriate interventions. The implication of this study is that if patients are not receiving adequate treatment, and if the optimum conditions were known, then care providers should work to change conditions in order to improve the care of hypertensive clients, to decrease morbidity and mortality from cardiovascular disease.

Research questions:

1) Do the interventions which are being prescribed for hypertensive patients meet the current standards of care for hypertension, as outlined by the JNC?

2) What personal characteristics of patients such as: age, race, ethnicity, gender or physique or their healthcare environments, such as their insurance

arrangements, predict that appropriate, adequate treatment is being prescribed by providers?

According to Hickey, Ouimette and Venegoni (1996), nurse practitioners will increasingly be providing the type of primary care that physicians have been giving in the past, especially as capitation and managed care increase. "Nursing and nurses are broadly focused on the healthcare needs of all people, especially of underserved and vulnerable populations." Nurses are exquisitely prepared to manage chronic illnesses, such as hypertension, a major focus in U.S. healthcare. So, advanced practice nurses can take the implications from this physician study and apply them to their practices, as they work with hypertensive patients in primary care.

THEORETICAL FRAMEWORK

Imogene King's conceptual framework of open systems and her theory of goal attainment apply to this project's central theme of differences in treatment of hypertensive patients (King, 1971.)

First, King's open systems framework is composed of three interacting systems; these are the personal systems, the interpersonal systems, and the social systems. Individuals comprise one type of system in the environment called the personal systems. Individuals interact to form dyads, triads, and small and large groups, which comprise another type of system called interpersonal systems. Groups with special interests and needs for organizations, which make up communities and societies are called social systems in King's theoretical framework.

For the purposes of this project, the healthcare practitioner and patient form an interpersonal system, generally a dyad King (1971.) King's concepts for interpersonal systems are interaction, communication, transaction, role, and stress.

Interaction means a dynamic reciprocity, defined as the observable behaviors of two or more persons in mutual presence. This is the provider-patient visit in the current study.

Communication, as defined by King (1971), is verbal or nonverbal, situational, perceptual, irreversible

interactions which transmit ideas from one person to another. For the current problem, this is the information that is shared between provider and patient at the visit.

King defines transactions as "a process of interactions in which human beings communicate with environment to achieve goals that are valued ... goal-directed human behaviors." For the current topic, transactions are directed toward reducing blood pressure and reducing the risk of cardiovascular disease.

The nurse's (or provider's) role is that of a professional, using skills, knowledge and values to identify goals and to help others to achieve goals. These goals would be the health and well-being of hypertensive patients, specifically the control of hypertension to avoid cardiovascular disease.

For this project, the individual or social systems are relevant, but are not the main focus. The main focus is on the interpersonal relationship between patient and caregiver. King's (1981) theory of goal attainment, however, is of critical relevance to the current topic.

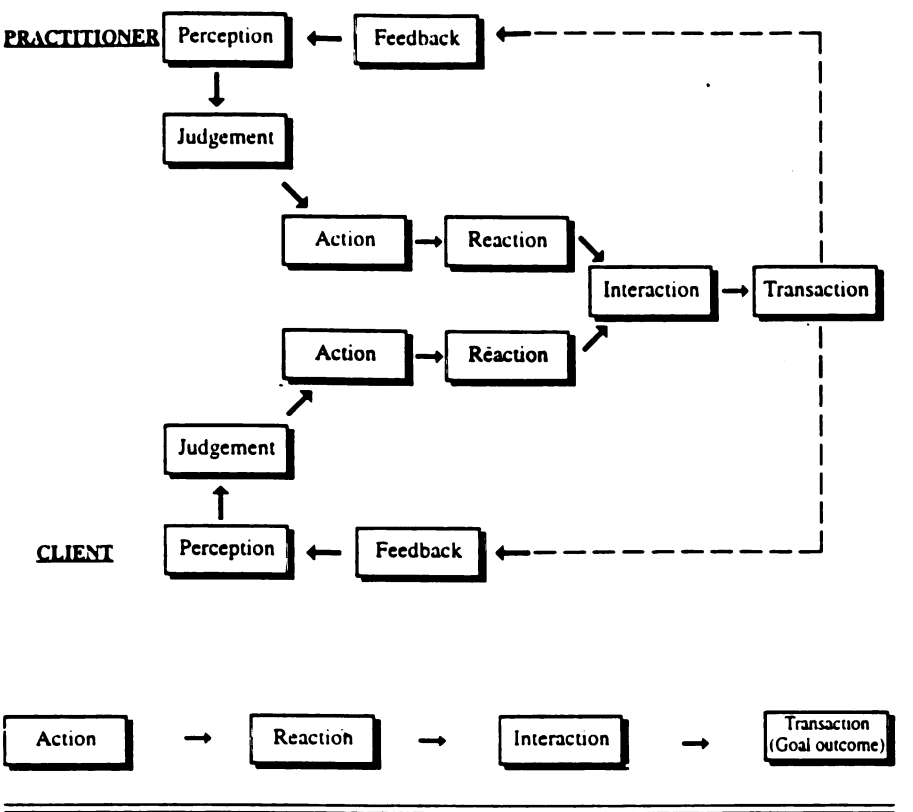
King explains her theory of goal attainment as "in the interpersonal systems in which two people, who are usually strangers, come together in a health care organization to help and be helped to maintain a state of health that permits functioning in roles." All of the above characteristics of interpersonal relationships apply. King

states that caregivers and clients communicate information, set goals mutually, and then act to attain those goals. The steps are the basics of the nursing process: assessment, diagnosis, planning, implementation and evaluation. For the current project, since only a one-time visit is studied, the assessment, diagnosis, planning are done within the context of the single, first-time visit of a hypertensive patient to a new provider. The patient comes away from the visit with a diagnosis of hypertension, and a plan of treatment. In some cases, the implementation is done within the single visit (such treatments as counseling.) In other cases, the implementation is only ordered at the visit, to be done at a later time. The evaluation is generally not done at this first visit, but at a subsequent visit, to discern the efficacy of treatment in lowering the patient's blood pressure. Only if a follow-up visit was not ordered, can we determine that evaluation was probably not done.

King's theory of goal attainment suits the current project in that we are looking at a way to interrelate several concepts to arrive at a determination of whether or not goals of lowering hypertensive patients' blood pressures could be met. King's way of relating the individual and the larger society to the specific interaction are particularly relevant to this study's

efforts at determining what factors help or hinder appropriate treatment of hypertension.

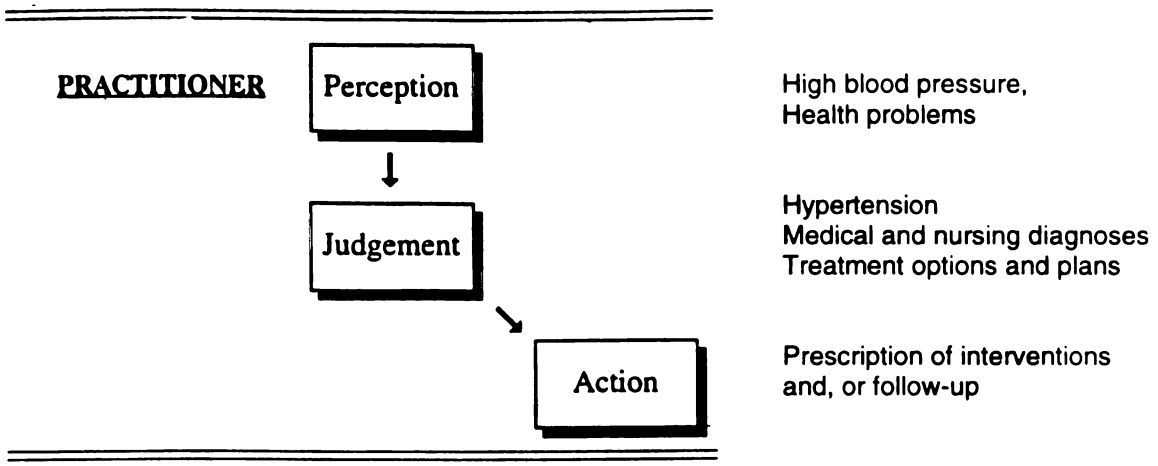
Figure 1: King's model of goal attainment.



This figure shows the relationships of the caregiver and client, whose separate perceptions lead to judgment, action, reaction, then together for interaction and transaction, or goal. Interaction is the client and provider meeting, where communication takes place, which can lead to mutual goal-setting, and subsequent goal attainment. The goal, in this case is control of the client's blood pressure.

The current study examines not this final goal, but the steps which lead to it. The outcome variables are the giving or ordering of correct treatments and the ordering of follow-up. Without knowing the specific content of the interaction between caregiver and patient, or the patient's perspective, the only part of this model which can be determined from the current study is the caregiver's perception, judgement and action. We can tell from the medical care survey that the patients have high blood pressures (perception) and that they have been diagnosed as having hypertension (judgement). We can tell from the survey what therapies or follow-up were ordered (action). The survey, as it was designed and utilized, tells us nothing else. King's model, as it applies to this survey, is only the portion shown in Figure 2.

Figure 2: King's model as it applies to this study.



REVIEW OF LITERATURE

Hypertension is a major risk factor for coronary heart disease (Houston, 1992). In the United States, approximately 50 million persons have elevated blood pressure or take antihypertensive medication (JNC, 1993). Primary hypertension develops from unknown causes between the ages of 25 and 55 years in persons without preexisting renal disease. Nonfatal and fatal cardiovascular diseases, including coronary heart disease and stroke, as well as renal disease and all-cause mortality increase progressively with higher levels of both systolic and diastolic blood pressure. These relationships are strong, continuous, graded, consistent, independent, predictive, and etiologically significant, according to the JNC (1993).

Blake (1994) stated that through the provision of continuous care and preventive medical education, family physicians are well equipped to recognize, manage and, possibly prevent hypertension in their patients. Much is known about how to treat hypertension successfully. Hundreds of studies have been done which examine both pharmacological and non-pharmacological treatments for hypertension. Over the past two decades, these studies have been closely evaluated by the National

Institutes of Health. Many of the studies, in fact, have been done by government researchers within the National Institutes of Health. The Fifth Report of the JNC (1993) is the Institute's recommendations based on all these studies. The recommendations are first for life-style modifications: tobacco avoidance, weight reduction, moderation of alcohol intake, physical activity, modification of dietary habits (moderation of sodium and fat intake, adequate intake of potassium, calcium and magnesium). If medications are ordered for the further reduction of hypertension, the JNC V recommends that these lifestyle modifications continue. (The 1988 Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure had the same recommendations for non-pharmacological treatment of hypertension.)

A meta-analysis of non-pharmacological interventions (Devine and Reifschneider, 1995) reviewed 102 studies between 1961 and 1993 and found that across all studies, a beneficial lowering of blood pressure was related to what was termed "psychoeducational care" -- such as educational programs for weight reduction, exercise, sodium restriction, compliance with medications, compliance with follow-up care, and relaxation.

Recommendations for non-pharmacological interventions include:

- Tobacco avoidance
- Weight reduction
- Moderation of alcohol intake
- Physical activity
- Modification of dietary habits
  - Limitation of sodium
  - Limitation of fat
  - Provision of adequate potassium
  - Provision of adequate calcium
  - Provision of adequate magnesium

The JNC did not find scientific evidence to support recommendations for reducing caffeine, for varying the proportions of carbohydrate or protein in the diet, for increasing amounts of garlic or onion. The report did not find sufficient evidence to support the use of relaxation or biofeedback therapies for definitive treatment of hypertension.

According to Alderman (1994), there is a direct positive relationship between body mass index and blood pressure. The Intersalt study of fifty-two communities world wide showed that weight, among all measured

characteristics except age, had the strongest and most consistent correlation with blood pressure (Intersalt Cooperative Research Group, 1988). Alderman (1994) stated that individuals with central or upper body obesity, as indicated by a higher waist-to-hip ratio, are even more likely to have an elevated blood pressure. Central obesity also carries a greater risk of cardiovascular mortality. Reisen, Abel, Modan, M., Silverberg, Eliahou and Modan, B. (1978) found that weight reduction lowers blood pressure. Even with sodium and potassium intakes constant, a 5 kg weight loss was associated with a systolic blood pressure reduction of 5.4 mm Hg and a diastolic reduction of 2.2 mm Hg. The Reisen group found that the addition of sodium restriction to weight loss enhances blood pressure decline.

A meta-analysis of seventy-eight sodium-reduction studies (Law, Frost, and Wald, (1991) showed that a 100 mmol (about 6 grams) reduction in daily sodium intake would lower systolic blood pressure by 14 mm Hg in hypertensives and 10 mm Hg in those with normal blood pressures. Since some of the studies in this analysis were not well controlled, a more rigorous analysis was done by Cutler, (1991) using only randomly-controlled trials. The Cutler analysis showed that a 100 mmol/day reduction of sodium was associated with a decline of 5.7 mm Hg systolic and 2.7 mm Hg diastolic in hypertensive subjects and 2.23 mm Hg systolic in those with normal blood pressures.

The Intersalt Cooperative Research Group (1988) reported that a high dietary potassium intake may protect against hypertension, and a potassium deficiency may increase blood pressure and induce ventricular ectopy. The group recommends that normal plasma concentrations of potassium should be maintained, by diet alone or, if necessary, by supplementation.

Hamet, and Lambert, (1991) found that calcium deficiency is associated with hypertension, and a low calcium intake may amplify the effects of a high sodium intake on blood pressure. The JNC (1993) stated that many but not all epidemiological studies showed an inverse association between dietary calcium and blood pressure.

The JNC (1993) stated that although there is some evidence of an association between lower dietary magnesium intake and higher blood pressures, the associations are not strong enough to recommend increasing magnesium intake for control of blood pressure.

In a review study of available research on the relationship between dietary fats and blood pressure, Sacks, (1989) looked at randomly controlled studies and found that diets varying in total fat and proportions of saturated fats to unsaturated fats had little, if any, effect on blood pressure. However, the JNC concludes that since dyslipidemia is a major independent risk factor for coronary artery disease, the limitation of dietary fat is

an important treatment to be included with treatments for hypertension. The American Heart Association states that a diet high in saturated fat and cholesterol is a main cause of high blood cholesterol and a high low density lipoprotein level. Both saturated fat and cholesterol raise the blood cholesterol level. Studies of large groups of people show that the risk of heart attack for a person with a blood cholesterol level of 240 mg/dl or more is twice that of a person whose cholesterol level is 200 mg/dl. (American Heart Association, 1993).

In the 1993 National High Blood Pressure Education Program Working Group Report on Primary Prevention of Hypertension the group stated that increased physical activity, either alone or as part of a weight loss program, has frequently been proposed as a means to lower blood pressure. The group sites more than thirty studies of various types. Some were observational studies of participants' activity levels and blood pressures, some were studies of exercise capacity and blood pressure, some were studies comparing physically active or physically fit participants with those age-matched subjects who were less active. All of these studies showed significant inverse relationships between levels of physical activity and blood pressures.

The Multiple Risk Factor Intervention Trial Research Group (Neaton, and Wentworth, 1992) showed a strong

positive relationship between smoking and death from coronary heart disease, although not specifically from hypertension. The National High Blood Pressure Education Program, however, found a positive relationship between smoking and hypertension, and recommends the avoidance of smoking for the prevention of coronary heart disease and stroke (Roccella, 1993). According to the National Institutes of Health publication, the Physician's Guide "How to help your hypertensive patients stop smoking" (1984), smoking and hypertension are two major independent risk factors for cardiovascular disease. The combination of these two risk factors greatly increases the probability of disease. The Framingham Heart Study data show that 40-year-old males who smoked and had elevated blood pressure (greater than 165 systolic) were three and one-half times more likely to develop cardiovascular disease than males without these risks. Males in this age group with elevated blood pressure but not smoking were only twice as likely to develop cardiovascular disease as those without these risks.

The National High Blood Pressure Education Program Working Group Report on Primary Prevention of Hypertension (1993) also evaluated the effect of stress management on hypertension. In several cross-sectional, case-control and prospective studies in a variety of populations, long-term stress appears to play an important role in the development

and maintenance of hypertension. The relationship between stress and hypertension seems to persist even after controlling for age, race, body mass index, type-A behavior, alcohol consumption, family history of hypertension, urinary sodium excretion, and physical activity. Recent studies have emphasized the role of job strain in the development of hypertension. Individuals who are exposed to stressful situations, but lack the decision-making ability to control their exposure and response, may be at special risk for hypertension. The studies have also indicated that lack of social support in the environment may also increase the risk of hypertension. Although these associations between stress and hypertension are well-established from research studies, successful treatment of stress for the reduction of blood pressure appears difficult. Studies of treatments such as relaxation and biofeedback show inconsistent results.

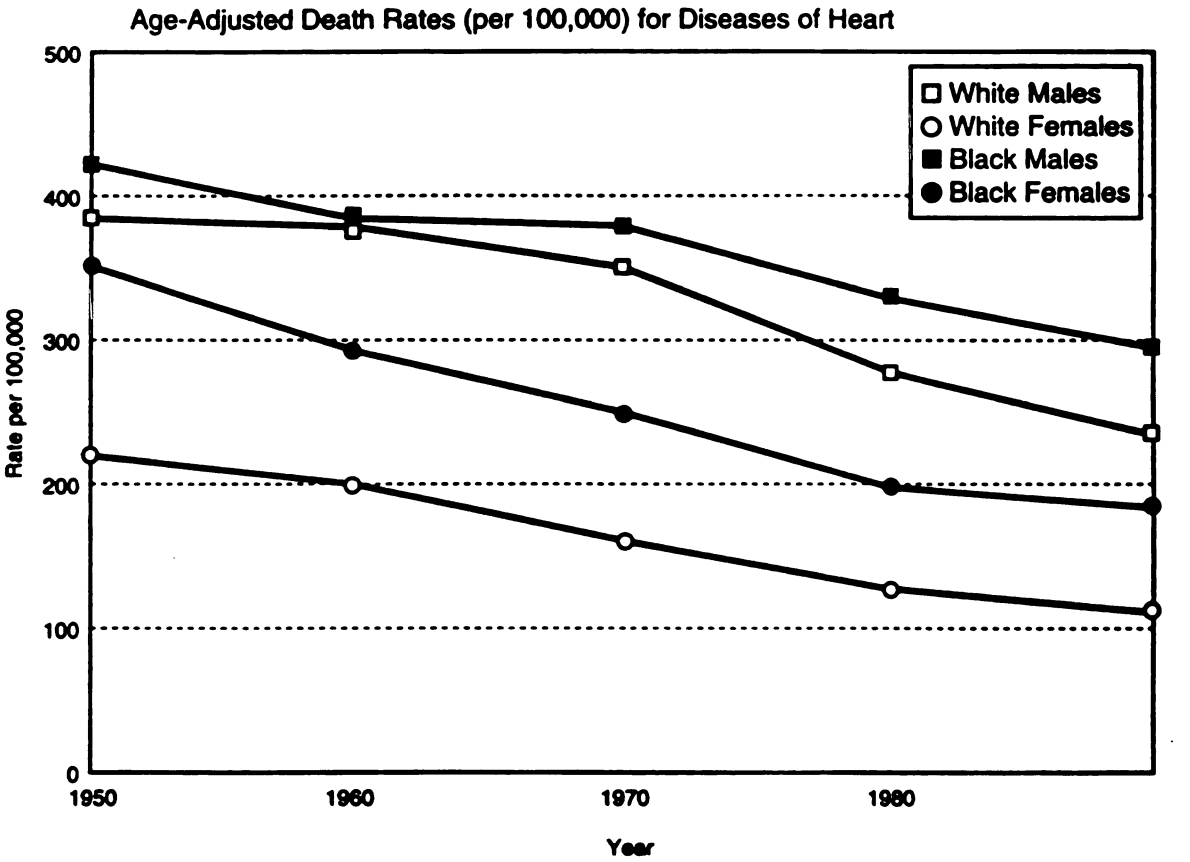
Shea (1994) stated in an editorial in the American Journal of Public Health that national surveillance data continue to show substantial gaps in detection, awareness, initiation of treatment and control of hypertension, with control rates even lower among minority and socially disadvantaged groups. He said studies of patients with hypertensive emergency and severe uncontrolled hypertension have found that almost all of these hypertensives were

aware of having hypertension and had been previously treated.

Since the literature states that hypertension is often asymptomatic, patients may have hypertension and not be aware of it. And even if hypertension is asymptomatic or unknown to the hypertensive individual, it can be causing cardiovascular problems. This is why the Joint National Committee for the Detection, Evaluation, and Treatment of High Blood Pressure (1988, 1993) recommends screening for hypertension and treatment when it is discovered. So, the current study includes patients who were discovered to have hypertension, regardless of the reason that brought them to see the physician at the surveyed visit. This is a study of what treatments are provided any time a patient presents to a physician's office visit with hypertension, even if the finding of hypertension was unexpected or not the reason for the visit. Finding and treating hypertension before it becomes symptomatic and before serious morbidity results is one of the main goals of the National Institutes of Health JNC.

Some research documents a significant gender gap in the treatment of cardiovascular disease. Of the 550,000 people who die each year of cardiovascular disease in the United States, 250,000 are women, according to the U.S. Public Health Service, National Center for Health Statistics (1993). Men and women have different patterns

of morbidity and mortality. Men have consistently shown higher rates of cardiovascular disease, although rates for both men and women have declined in recent years. Black men have higher death rates for cardiovascular disease than white men, and black women have higher rates than white women. See Figure 3:



Age-adjusted death rates (per 100,000) for diseases of the heart. (From United States Public Health Service, National Center for Health Statistics. *Health, United States, 1988*. DHHS Pub. No. [PHS] 89-1232. Washington, D.C., U.S. Government Printing Office, 1989.)

Figure 3: Age-adjusted death rates (per 100,000) for diseases of heart.

According to Douglas, (1993), although women utilize the health care system more frequently than men, recent studies indicate that they have less access than men to certain significant diagnostic and therapeutic interventions, especially those related to cardiovascular disease and organ transplantation. Armitagge, and Schneiderman, (1979) examined the extent of the workup physicians ordered on patients with one of five complaints common to both men and women: chest pain, back pain, headache, dizziness, and fatigue. Across the board, men received a more extensive workup than women for all complaints studied. The researchers could not explain the difference on the medical facts alone.

There are other patient characteristics that affect their health. Black women have one and a half times the death rate from heart disease as white women (National Center for Health Statistics, 1988). Among the elderly, blacks and the poor are less likely to possess private insurance to supplement their Medicare health insurance coverage (Rice, and McCall, 1985).

As a consequence of these disparities, those who live below the poverty line, and a higher proportion of blacks do, are less likely to receive preventive care services or routine care for chronic disease (Kleinman, Gold, and Makuc, 1981).

Shea, (1994) stated that the shortfall in hypertension control reflects factors related to the population as well as to the health care delivery system. For example, educational level and social class are powerful predictors of health outcome in many diseases and undoubtedly work in multiple ways. Thus, one goal for better control of hypertension in population groups would be to improve the quality of primary care. According to Shea, for hypertension control, active physician involvement is needed in the process of promoting compliance, which has long been recognized as a central issue in achieving blood pressure control. To this end, Shea suggests the use of periodic surveys of hypertensive patients to monitor attainment of specific objectives for hypertension control by different provider organizations. This is a concept of "scorecard medicine" to assess if physicians and healthcare groups are meeting certain treatment criteria for hypertensive patients.

Hannan, Kilburn, Racz, Shields, and Chassin, (1994) have studied this type of "scorecard medicine" for patients who had coronary artery bypass graft surgery in New York, and have found that it is helpful in improving outcomes (decreased mortality and morbidity) for patients.

A large study done with Veteran's Administration (VA) patients by Blue Cross and Blue Shield Association (Shepard, 1995), however, showed that certain factors like

a greater number of laboratory tests, a greater time spent in the waiting area and greater numbers of medications are negatively associated with cost-effective control of hypertension. This study reported that the factors positively associated with cost-effective control of hypertension are continuing care of the patient, greater time spent with the patient during the visit, counseling given to the patient, and no medications given at the first visit. This study was longitudinal, and looked mainly at future health-system costs such as hypertension-related hospitalizations, and increased costs of clinic management of these patients, including the costs of tests and medications for these VA patients.

The studies cited above show that correct therapeutic treatments can certainly lower patients' blood pressures and decrease morbidity and mortality from cardiovascular disease. Some of the studies show statistics about treatment failures, and estimates of the numbers of untreated hypertensives in the population. However, none of these studies show what is being done in general primary care settings to screen people for high blood pressure and to treat those who are found to have hypertension. A link needs to be made between what is known to be beneficial and what is actually being done in routine patient care.

As stated in a special article, the National High Blood Pressure Education Program Working Group report on

primary prevention of hypertension (1993): Despite its undoubted benefits, treatment of established hypertension is not a panacea. This approach requires an ongoing commitment to the task of identifying and treating incident cases. Each year approximately two million new hypertensive patients are added to the pool of patients requiring treatment for high blood pressure. The situation is compounded by the fact that hypertensive patients may be unaware of their condition. In addition, many sustain vascular damage to their heart, brain, eyes or kidneys before they come to the attention of a health care provider, and many more are inadequately treated. Provisional estimates suggest that approximately one third (35 percent) of the 1988 through 1991 National Health And Nutrition Examination Survey III (NHANES III) survey participants with a systolic blood pressure (SBP) of 140 mm Hg or more or a diastolic blood pressure (DBP) of 90 mm Hg or more reported that they were unaware of a diagnosis of hypertension. Even more troublesome, only forty-nine percent of those with hypertension (those on antihypertensive drug therapy or those with SBP greater than or equal to 140 or DBP greater than or equal to 90) were receiving antihypertensive medications, and only 21 percent of those being treated with antihypertensive medications had a blood pressure less than 140/90 mm Hg. These NHANES III findings are based on BP measurements

obtained at a single visit and may exaggerate the extent of undertreatment in the community. Despite this limitation, they suggest that large numbers of hypertensive patients are unaware of their diagnosis and that many who are being treated for hypertension probably have suboptimal blood pressure control. Kligman, (1993), stated that without treatment, 70 percent of hypertensive patients die of congestive heart failure or coronary heart disease, 15 percent die of cerebral hemorrhage and 10 percent die of uremia.

This indicates a need to look closely at the physician's office visits of these hypertensive patients and to determine what characteristics of patient or setting that may be associated with an increase in likelihood of adequate treatment. There is clearly a need to attempt treatment of hypertension at any hypertensive patient's entry into the healthcare system. It would greatly help if it was understood what variables are significant in this process. The current study might help to disclose factors which can improve the likelihood of treatment and control of hypertension.

The current study uses data collected from a large national stratified random sample of patient visits to physician offices. The data set, which included physicians' office visits from many areas, metropolitan to rural, and from many types of office settings, and from

many types of patients, provides a very broad sampling of typical patients. The instructions given to the physicians completing the surveys were thorough and explicit. The broadness and representativeness of the survey help to make it an accurate picture of what is done during actual patient visits.

The two purposes of this study are: 1) To determine if hypertensive patients are getting adequate treatment when first found to have hypertension; and 2) To determine what personal characteristics of patients or their environments, such as insurance arrangements, might predict the giving of adequate treatment or follow-up.

METHODS

I. THE DATA BASE SURVEY.

A. NATIONAL AMBULATORY MEDICAL CARE SURVEY.

This study uses 1992 data from the National Center for Health Statistics (NCHS), as outlined above. The data consist of samples of records of medical care given to patients seen by office-based physicians. The basic sampling unit is the physician-patient encounter or visit. The physicians included in the study were from lists of providers classified by the American Medical Association or the American Osteopathic Association as those giving office-based care. Excluded were federally-employed physicians, and specialists in anesthesiology, pathology and radiology. Also excluded were ambulatory encounters made by phone, outside of physicians' office, and those made in hospital or institutional settings.

In 1992 there were 34,606 patient records provided by 1558 doctors that participated in the survey. The 1992 NAMCS utilized a multistage probability design that involved probability samples of primary sampling units--geographical areas--, physician practices within the primary sampling units (PSU) and patient visits within practices. A PSU is a county, a group of adjacent

counties, or a standard metropolitan statistical area. The first stage sample included 112 PSUs.

The second stage consisted of a probability sample of practicing physicians selected from the master files maintained by the American Medical Association and the American Osteopathic Association. Within each PSU, all eligible physicians were stratified by fifteen specialty groups: general and family practice, osteopathy, internal medicine, pediatrics, general surgery, obstetrics and gynecology, orthopedic surgery, cardiovascular diseases, dermatology, urological surgery, psychiatry, neurology, ophthamology, otolaryngology, and all other specialties.

The final stage was the selection of patient visits within the annual practices of sample physicians. This involved two steps. First, the total physician sample was divided into 52 random subsamples of approximately equal size, and each subsample was randomly assigned to one of the 52 weeks in the survey year. Second, a systematic random sample of visits was selected by the physician during the assigned week. The sampling rate varied for this final step from a 100 percent sample for very small practices to a 20 percent sample for very large practices, as determined in a presurvey interview.

The first contact with the sample physician was through a letter from the director of the National Center for Health Statistics. Next, a representative phoned to

set up an appointment to discuss the survey and instruct the doctor on how to complete the forms.

The actual data collection for the NAMCS was carried out by the physician, aided by his or her office staff when possible. Two data collection forms were employed by the physician: The patient log and the patient record. The patient log is used to sequentially list patients seen in the physician's office during his assigned reporting week. This list served as the sampling frame from which to sample the visits for which data were to be recorded. A perforation between the patient names and patient visit characteristics permitted the physician to remove patient names and protect confidentiality.

Based on the physician's estimate of the expected number of office visits, each physician was assigned a patient-sampling ratio. These ratios were designed so that about 30 patient record forms were completed for each physician office during the assigned reporting week. Physicians expecting ten or fewer visits each day recorded data for all of them, while those expecting more than ten visits per day recorded data for every second, third, or fifth visit based on the predetermined sampling interval. These procedures minimized the data collection workload and maintained approximately equal reporting levels among sample physicians regardless of practice size. For physicians assigned a patient sampling ratio, a random

start was provided on the first page of the log, so that predesignated sample visits on each succeeding page of the log provided a systematic random sample of patient visits during the reporting period. For more information about the data, and for definitions, see Appendix A.

Reliability and Validity Checks:

For each visit, information on many variables is collected and coded, including patient characteristics, conditions, tests, treatments given and disposition of each visit. For data processing, completeness checks were made by the field staff, then clerical checks were made on receipt of the data for central processing. Item non-response rates were less than five percent for most data items. The only exceptions were visit duration (seven percent), patient ethnicity and whether patient had been seen before for the same condition (both eleven percent). Information from the induction interviews and patient record forms was keypunched with 100 percent verification of the correctness of clerical data entry, according to information provided by NCHS, and converted to electronic data file. Extensive computer consistency and edit checks were also performed. Data items still unanswered at this point were imputed by randomly assigning a value from a patient record form with similar characteristics; imputations were based on physician specialty and broad

diagnostic categories. Any data field imputed in this manner is indicated by a code in one of the columns on the data file.

This survey has been administered over many prior years, however, with extensive testing of the instrument for reliability and validity since 1972.

The National Center for Health Statistics has supplied information about the reliability and validity of the data. For more detailed information on reliability, see Appendix B.

Human Subjects Approval:

Since this was an administrative data collection procedure and the data were collected from regular office visit records, the survey caused no physical harm to the subjects. This was not an experimental study. The treatment of the patients did not change due to the physician's participation in this study. Concerning the present researcher, the secondary analysis is based on data published under Federal guidelines, which protect the rights of human subjects and make it impossible to trace or identify any of the individuals or practice groups involved. The University Committee on Research Involving Human Subjects has approved this project. See Appendix C.

B. DATA FOR THE CURRENT STUDY (SAMPLE).

The current study is concerned mainly with non-pharmacological treatments given to hypertensive patients at physician's office visits. From the 34,606 visit records, only those who had been diagnosed as having hypertension were selected for study, because the current study relates to hypertension. Also, because the study deals with initial treatments, only first visits for hypertension at the office or clinic are included in the data subset.

Among patients with hypertension, only those who had not been seen before by the current physician were selected. This selection was done in order to look at initial treatments given to hypertensive patients. Although some of these patients may have been diagnosed with hypertension at some other time by a different physician, they were new to the current physician at the time of the visit, as defined by the survey questionnaire. The reason for looking only at new patients is to rule out the possibility that the prescribed treatments had already been ordered for each patient at a prior visit to the current physician. No medical histories of the patients were supplied by this survey, and no information about later visits to any physician was available because of the way the study was constructed. This is a stratified random sample of patient visits, an attempt at a cross-section of

all physician-office visits during 1992. The subset of patient visits meeting all selection criteria involves a sample of 573 subjects for study.

Finally, a frequency distribution showed that six patients were children. These were excluded from the subset, because the focus of the current study is on adult hypertensive patients, not on pediatric patients. The final subset total was 567 patients.

Several of the survey variables related to diagnoses. These were in code numbers, using the International Classification of Diseases and Assessments. The subset was searched for codes which related to secondary, or complicated hypertension. The intention was to eliminate such complicated cases from the study. There were no cases of secondary hypertension in the subset, however. The final subset total remained at 567 patients.

II. VARIABLES.

For this study, the following variables have been selected for examination: age, gender, race, ethnicity, classification of obesity, hypercholesterolemia, smoking status, chief complaint or reason for the visit, diagnosis, type of insurance or payment arrangement. Then, the disposition of each visit was noted: whether or not the patient was referred to another physician, referred back to a referring physician, referred to a specialist, told to

return at a specified time or date for follow-up, or admitted to a hospital.

For purposes of examination, several variables were recoded. The following section will describe all the variables and explain any recodings.

Age: Ages of the patients were derived from exact birthdates provided by the medical record data. For easier statistical calculations, the age variable was split into quartiles, with group one the youngest one-fourth, to group four, the oldest one-fourth.

Gender: Female was coded (1), male was coded (2).

Race: The four-category race variable (white, black, Asian or American Indian) was subdivided and recoded into two separate dichotomous variables: 1) black (coded 1) or non-black (coded 0), and 2) Asian (coded 1) or not Asian (coded 0). None of the patients in the study were American Indian, so this category from the larger sample was dropped. White was the default variable, if not black or Asian. It was necessary to recode race into these dichotomous variables because a three-category race variable is meaningless for correlations and regression.

Ethnicity: This was coded (1) for Hispanic origin, or (2) for non-Hispanic.

Obesity: This quality came from a part of the original survey where the physician was asked to state if the patient had one of several conditions at the time of

the visit. No definition of obesity was given to determine if a patient qualified for this description or not. The physician was simply asked to state yes or no if the patient was obese. The physician was left to use his or her own clinical judgement to determine this category. It was coded (0) for no, (1) for yes.

Hypercholesterolemia: This was another condition as obesity, above, in which the physician was asked to make a clinical judgement and categorize each patient according to cholesterol levels. Again, no exact definition or laboratory levels were given for determining this category. The responses were coded (0) for no, (1) for yes if the patient had hypercholesterolemia.

Smoking status: The "Smoke cigarettes" variable was recoded from a three-category variable (smoking, not smoking or unknown smoking status) to a dichotomous variable: Smoking (1), or Not smoking (0). If smoking status was unknown, the patient was coded "System-missing" for this variable. When smoking status was used for statistical analysis, only those with known smoking status were used.

Type of insurance or payment arrangements: These were separate dichotomous variables in the original study. Each was coded (1) for yes, meaning the patient had a particular type of insurance or payment arrangement or (0) for not having it. The separate types were: Commercial insurance,

health maintenance organization, Medicaid, Medicare, and patient or private payment. The physician was instructed to check the source of payment to the best of his or her knowledge, and to check all that applied. It is possible to have more than one choice for each patient.

Therapeutic services: The survey respondent was requested to check all appropriate boxes for the listed services if provided or ordered during the office visit. All forms of medication were to be excluded from this area of the survey, as medications were noted in a different section. This section was to include only counseling or education services. The listed services which were included as variables in this study are: Diet therapy, exercise therapy, cholesterol-reduction therapy, weight-reduction therapy and smoking cessation. Each of these variables was coded (1) for yes, the therapy was given or ordered, or (2) for no.

All the data analysis is done on a microcomputer using SPSS software. Details of the analysis plan follow.

Variables which measure appropriateness of care (interventions):

Appropriate treatments for these hypertensive patients fall into three categories:

1) Non-pharmacological: counseling or education

2) Pharmacological: antihypertensive medication

3) Follow-up or referral

According to the literature, especially the Joint National Committee, Fifth Report (1993), non-pharmacological counseling or education for lifestyle changes (like diet or exercise) is always appropriate for hypertensive patients. Pharmacological treatment is appropriate if blood pressure cannot be controlled with lifestyle changes. Since we do not know the details of the lives of these patients, it is remotely possible that they may not have any major lifestyle problems which contribute to their hypertension. So any pharmacological treatment of hypertension could be appropriate for a patient as a beginning therapy. The JNC states that follow-up visits for hypertensive patients are essential. The 1993 report says, (the) "Frequency of visits and intensity of evaluation and treatment should be the minimum sufficient to achieve and maintain control of blood pressure and other major risk factors and to contain progression of vascular disease." Failure to follow-up with a hypertensive patient would always be inappropriate.

Each of these three categories will be explained in more detail:

1) The non-pharmacological antihypertensive treatments given to these hypertensive patients include

counseling or education: diet, exercise, cholesterol reduction (if cholesterol levels are high), weight reduction (if obese), smoking cessation (if smoking). The content of the teaching interventions are not known from the survey data. The survey instructions given to the physicians reads, "Item 16, Therapeutic services: Check all appropriate boxes for the listed services if provided or ordered during the visit. All forms of medication should be excluded as this will be collected in item 17."

All the non-pharmacological, or behavioral (counseling or education) treatments are first counted. Since each separate service is coded (1) for yes, (0) for no, the total number of treatments can be tallied. The number of services which each patient received is quantified. Next, this variable is recoded for each patient into a new variable called "behavior". This is coded (1) if <u>any</u> counseling or education is ordered or given, or (0) if none is provided.

Thus, a measure of appropriateness is whether or not at least <u>one</u> of these treatments were given or prescribed at the visit. Since we already know from the survey that the patient has hypertension, we would expect, from being familiar with the literature and the standards of care that have been outlined over several decades by the Joint National Committee, that some type of non-pharmacological treatment is appropriate. The exact treatment given would

vary according to the specifics of each case. But the only inappropriate care from the standpoint of the current study would be no treatment.

The first outcome variable for this study then is "Behavior", a dichotomous category of whether or not a non-pharmacological behavioral intervention is provided to a hypertensive patient. This variable will be used for frequencies, correlations and a regression. This will indicate how many the patients received this therapy, what other factors the variable is related to, and what might predict the likelihood of a patient to receive this therapy.

2) In addition to these non-pharmacological treatments, the giving or ordering of an antihypertensive medication was also deemed appropriate because a physician may determine during the visit that the patient has no lifestyle risks that needed to be addressed or that the hypertension is so severe that pharmacological treatment is indicated immediately.

Because detailed pharmacological information was included in the original survey, it was possible to determine which patients were given any antihypertensive medications at the surveyed visit (or given a prescription for any). In the original survey, it was possible to indicate up to three separate medications given or prescribed at the visit. The medications were indicated in codes which showed their

function. Through a process of recoding, the antihypertensive medications were quantified for each patient into a new variable called "vascular medications". This variable was coded "yes" (1) for being given or prescribed any antihypertensive medication, or "no" (0) for no antihypertensive medication.

3) A further consideration of appropriateness of care must take account of the disposition of the patient visit (follow-up or referral). Several possible dispositions were given, including referral to another physician, scheduling an appointment for return at a specified date or a certain time interval or admission to a hospital, or no follow-up. According to the literature, any of the preceding follow-up measures constitute appropriate care, except no follow-up. Each of the above variables was coded (0) for no, or (1) for yes if the disposition was planned or ordered. These were grouped and recoded into a new variable called "follow-up". A measure of no (0), or (1) yes, is used to code this new variable. Any type of follow-up means that the patient remains in the healthcare system and has the possibility of maintaining control over blood pressure. No follow-up would leave the patient at risk for uncontrolled hypertension and a progression of vascular disease, according to the JNC.

Combining the three above treatment and follow-up variables yields a single measure of appropriateness, the second outcome variable for this study. The three variables of non-pharmacological, medications and follow-up are recoded into a new variable called "intervention". Appropriate care is defined for this study as at least one of the three treatment or follow-up interventions. Inappropriate care is defined as: no treatment without follow-up (0). All other care represents various degrees of appropriateness lumped together into a single category of "intervention" (1). This outcome variable will be used in the final logistic regression in an attempt to determine what factors might predict appropriate treatment for patients with hypertension.

The definition of appropriate care employed here is extremely liberal. It assumes that all the behavioral, counseling or educational treatments are relevant and effective. It assumes that the antihypertensive medications are correct for each patient and are given in the right dosages and times. It assumes that the follow-up care will be therapeutic and proper. The survey does not provide any details about the quality of any of these measures, so that assuming they are correct is very optimistic.

Potential Predictors of Appropriate Care:

The study looks at any differences in the above treatments for different groups of patients. The groupings are by (1) patient characteristics: age, gender, race, ethnicity; (2) payment type: HMO, Medicare, Medicaid, commercial or private insurance or patient payment. Correlations will be computed to determine the effects of individual variables on the dependent variables, behavioral and overall treatment. Two logistic regression analyses are performed to determine the effects of all of the independent variables simultaneously on the dependent variable. One analysis looks at the dependent variable behavioral therapy, the second looks at the dependent variable of any appropriate treatment or follow-up. Logistic regression is used because the dependent variable is dichotomous instead of continuous. The logistic model is set up to ensure that the resulting probability will be between zero and one.

The purposes, again, are to see first how often appropriate treatments are given, and secondly, to see if any of the above characteristics of the patient or the setting influence the types of treatment given to hypertensive patients.

RESULTS

A. CHARACTERISTICS OF THE DATA SUBSET (of 567 total patients).

General comments about the subset.

The data subset is roughly similar to a cross-section of the United States population with some exceptions. These hypertensive patients are significantly older than is the general population. And, of course, the sample included only adults. Females in the study sample outnumbered males, 308 to 259. The proportion of females to males in the subset is greater than in the general population (51.2 percent female to 48.8 percent male), but the sample represents only adults and includes many older adults which are more likely to be women in the population because women have a greater life expectancy. So the study sample is actually very close to the general population in gender distribution.

In the study sample, the percentage of blacks are almost identical to that of the general population. Asians and Hispanics, however, are underrepresented in the study sample compared to the percentages in the general population. There are no native American Indians in the sample; again an underrepresentation.

The percentages in the subset of people who were classified as obese or identified as smoking cigarettes are

slightly higher than in the general population. This is probably an indication that these are risk factors for hypertension.

Table 1. FREQUENCIES OF THE PATIENT CHARACTERISTICS.

a. Patient Characteristics.

1. Age (in years).	Mean	Median	St. Dev.	Range
	61.5	64	14.48	18-91

Patient Characteristics	Number	Percent
Female	308	54.3
Male	259	45.0
3. Race.		
White	486	85.7
Black	69	12.2
Asian or Indian	12	2.1
4. Ethnicity.		
Non-Hispanic	545	96.1
Hispanic	22	3.9
5. Obesity.		
Obese	109	19.0
Not obese	464	81.0
6. Smoking cigarettes.		
Smoking cigarettes	58	10.1
Not smoking cigarettes	362	63.2
Smoking status unknown	153	26.7
7. Hypercholesterolemia.		
Elevated cholesterol levels	68	11.9
Normal cholesterol levels	505	88.1

b. Type of Insurance or Payment Arrangements.

Commercial insurance	192	33.9
Health maintenance organization	93	16.4
Medicaid	45	7.9
Medicare	253	44.6
Patient, private payment	66	11.6

B. TREATMENT AND FOLLOW-UP FREQUENCIES. (The survey allowed multiple responses.)

The following section lists the frequencies of the ordering of behavioral treatments, antihypertensive medications, follow-up or referral, and various combinations of these.

Table 2. TREATMENT AND FOLLOW-UP FREQUENCIES.

a. Treatments	Yes	No
	Number, percent	Number, percent
1. Diet therapy.	87 (15.3)	480 (84.7)
2. Exercise therapy.	72 (12.7)	495 (87.3)
3. Cholesterol therapy.	33 (5.8)	534 (94.2)
4. Weight reduction therapy.	51 (9.0)	516 (91.0)
5. Smoking cessation.	14 (2.5)	553 (97.5)
(Of the 58 smokers)	14 (24)	44 (76)

6. Therapy for the obese.

No. of Treatments	Number, percent	
None	68	(63.6)
One	6	(1.1)
Two	16	(15.0)
Three	17	(15.9)

7. Therapy for those with elevated cholesterol levels. For the 68 patients identified as having high cholesterol levels, 33 (48.5 percent) were given therapy for reducing cholesterol.

8. Total behavioral treatments (counseling, education) for lowering blood pressure.

   445 patients (78.5 percent) got no treatment.
   122 patients (21.5 percent) got at least one treatment, as follows:

No. of Treatments	Number, percent
One	48 patients (8.5 percent)
Two	34 patients (6 percent)
Three	22 patients (3.9 percent)
Four	15 patients (2.6 percent)
Five	3 patients (0.5 percent)

9. Antihypertensive medications.
   417 patients (73.5 percent) got no medications.
   150 patients (26.5 percent) got at least one medication.

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b. Disposition of the visit

(Multiple responses allowed)

	Yes Number, percent	No Number, percent
Follow-up or referral.		
119 patients (21 percent) got no follow-up, no referral.		
448 patients (79 percent) got follow-up or referral.		
1. Follow-up: (Given appointments or told to return at a specified time).	379 (66.8)	188 (33.2)
2. Referral:		
To another physician:	22 (3.9)	
Back to referring physician:	33 (5.8)	
To another physician	16 (2.8)	
To another specialist:	15 (2.6)	
For hospital admission	15 (2.6)	

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c. Treatment combinations.

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1. Total treatments for hypertension, including antihypertensive medications.

   348 patients (61.4 percent) got no treatments for hypertension.
   219 patients (38.6 percent) got at least one treatment, as follows:

No. of Treatments	Number, percent
One	122 (21.5)
Two	38 (6.7)
Three	35 (6.2)
Four	15 (2.6)
Five	8 (1.4)
Six	1 (0.2)

2. Any treatment or follow-up: (1) behavioral, (2) medications, or (3) follow-up or referral.

   82 patients (14.5 percent) got no treatment or follow-up.

   485 patients (85.5 percent) got at least one, including:
   292 patients (51.5 percent) got one.
   151 patients (26.6 percent) got two.
   42 patients (7.4 percent) got all three.

C. CORRELATIONS BETWEEN VARIABLES.

Correlations were computed to assess the associations between various characteristics and treatments. Table 3 contains only the correlations between the outcome variables of interest and characteristics of patients or the payment arrangements. As can be seen, with the exception of obesity, which correlated with getting a "behavioral" treatment at 0.27, these correlations are generally very small, though many are statistically significant. The correlations among the potential predictor variables (patient characteristics and insurance arrangements) are not shown here, but they too are uniformly low, most less than 0.3.

Table 3: BIVARIATE CORRELATIONS MATRIX (n = 567)

Characteristic	"Intervention"	"Behavior"
1. "Intervention"	.56*	
2. "Behav"		.56*
3. Age	-.1*	-.19*
4. Gender	0.0	.04
5. Black/not	.1*	.06
6. Asian/not	.04	-.02
7. Ethnicity	-.04	-.05
8. Obesity	.12*	.27*
9. Hyperchol.	.03	.16*
10. Smoker	.04	.11*
11. Com.Insur.	.02	.11*
12. H.M.O.	-.05	-.01
13. Medicaid	.04	-.04
14. Medicare	-.12	-.2*
15. Priv.Pay.	.14*	.12*

* Indicates the correlation coefficients which are statistically significant at p=0.05 or less.

D. LOGISTIC REGRESSION TO DETERMINE PREDICTORS OF TREATMENT.

Two separate logistic regressions were performed, to estimate the odds of predicting appropriate treatment on the basis of the identified set of independent variables. One regression was done for the outcome variable "Behav", to predict the odds of a patient getting behavioral therapy for the reduction of hypertension. The other regression was done for the outcome variable "Intervention", to predict the odds of a patient getting any of the therapeutic treatments or follow-up.

For the first regression, only two of all the independent variables were significant predictors of a patient getting the counseling or education therapies to control blood pressure (dependent variable: "Behav"). These two predictor variables were obesity and ethnicity. Obese patients were 2.8 times more likely to get behavioral therapeutic treatments than non-obese patients. This odds ratio was significant to p=.000. Hispanics were less than one-third as likely as non-Hispanics to get behavioral treatments. This odds ratio was significant at p=.016 (see Table 4a).

The second regression tested the likelihood of getting "Intervention", any appropriate behavioral or pharmacological treatment or follow-up. This regression

showed that there were some differences in odds ratios for some of the variables in the sample. The strongest difference was that Medicaid patients appeared 3.5 times more likely to get any of the interventions. However, none of the differences was statistically significant. They could have occurred by chance or sampling irregularity.

None of the independent variables, patient characteristics or payment arrangements showed any significant effect on the dependent variable "Intervention". A patient's likelihood of getting appropriate care or follow-up was not significantly affected by the independent variables (see Table 4b).

Table 4a.
Logistic Regression to Predict the Odds of Patient or Setting Characteristics to Influence Behavioral Therapeutic Treatments ("Behav").

Variable	B	S.E.	Wald	Sig	Odds
Age	-.1304	.1363	.9156	.3386	.8777
Gender	.1679	.2189	.5886	.4430	1.1829
Black/not	.3711	.3153	1.3852	.2392	1.4494
Asian/not	.3956	.7146	.3065	.5799	1.4853
Ethnicity	-1.1733	.4887	5.7635	.0164	.3093
Obesity	1.0147	.2477	16.7816	.0000	2.7586
Comm. Insur.	.3358	.2644	1.6135	.2040	1.3991
HMO Pay.	-.3302	.3668	.8101	.3681	.7188
Medicaid	-.0285	.4425	.0042	.9486	.9719
Medicare	-.6332	.3417	3.4332	.0639	.5309
Patient Pay	.4362	.3262	1.7882	.1811	1.5468

Table 4b.
Logistic Regression to Predict the Odds of Patient or Setting Characteristics to Influence Behavioral or Pharmacological Treatment or Appropriate Follow-up ("Intervention").

Variable	B	S.E.	Wald	Sig	Odds
Age	.1181	.1506	.6150	.4329	1.1254
Gender	-.0418	.2445	.0293	.8641	.9590
Black/not	.3184	.4311	.5453	.4602	1.3749
Asian/not	-.1678	.8034	.0436	.8346	.8455
Ethnicity	.0616	.6511	.0090	.9246	1.0636
Obesity	.0448	.3217	.0194	.8893	1.0458
Commpay	.0187	.2992	.0039	.9503	1.0188
HMOpay	-.5291	.3765	1.9751	.1599	.5891
Medicaid	1.2622	.7628	2.7378	.0980	3.5332
Medicare	-.2244	.3845	.3408	.5594	.7990
Patient pay	1.3463	.4445	.6071	.4359	1.4139

DISCUSSION

The frequency of giving therapy to reduce hypertension in these hypertensive patients was remarkably low. This clearly disregards the guidelines outlined by the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (1993). Perhaps even more surprising is that a full 14.5 percent of these hypertensive patients were given no treatment and no follow-up. And 78.5 percent of the hypertensive patients were given no counseling or educational therapy for reducing their blood pressure. These findings are perhaps the most significant of this study. Many patients clearly are not being given appropriate treatment for hypertension.

When being surveyed for a National Institutes of Health study, physicians would probably be more likely rather than less likely to give the correct and appropriate treatments. So these low treatment rates are difficult to understand.

The percent of patients receiving at least one appropriate treatment also was very low. Only 60.7 percent of all these hypertensive patients got any treatments for hypertension, including medications. This is a very significant finding. And only 85.5 percent of these patients got any treatment or follow-up. It is highly

significant that 21 percent of the patients newly identified as having hypertension at an office visit with a physician did not get any type follow-up for the hypertension.

Three of the patient characteristics, age, race, and obesity were significantly correlated with the dependent variable, "Intervention". One payment arrangement, private payment was significantly correlated with "Intervention". It is a note-worthy finding of this study that most of these patient characteristics or payment arrangements did not significantly affect the appropriateness of their care. The patients identified as having high cholesterol levels or identified as smoking were not significantly likely to be given the "Intervention", appropriate treatment or follow-up. These are significant findings from this study. This lack of appropriate treatment clearly violates the acceptable standards of care, outlined in the literature.

The patient characteristics of age, obesity, elevated cholesterol levels and smoking were significantly correlated with getting the counseling or educational therapy "Behav". Age was negatively correlated, meaning that the oldest patients were less likely to get a counseling or behavioral intervention. The other characteristics were positively correlated. Specific

therapies were generally directed toward obvious patient needs.

The obesity status of patients (comparing obese to non-obese hypertensive patients) correlates only 0.12 with getting or not getting any therapeutic treatments to reduce their health risks, as measured by the outcome variable "Intervention". Obesity status is, however, somewhat more strongly related to behavioral intervention.

Compared to non-smokers, hypertensive smokers were not significantly more likely to be given smoking cessation therapy. This treatment would always be appropriate. This is especially surprising because these patients were identified at the visit as being hypertensive and smoking, a high-risk combination.

In the logistic regression predicting the behavioral interventions alone, the only predictors that were significant were obesity and ethnicity. Obesity greatly increased the odds of getting care, and Hispanic ethnicity greatly decreased these odds. It is not possible to determine from this study what factors caused the significant influence of these two variables. This is an area that would warrant further study. There may be other factors which are not clear from this survey which have caused these results. For instance, the majority of the Hispanic patients were from metropolitan regions in the Southern and Western United States. These include some

very large cities such as Miami, Los Angeles, Houston and Dallas. The offices may have been crowded or understaffed. The offices may not have had the resources to offer the correct therapeutic interventions. For the obese patients, their risk factor of obesity was probably difficult to ignore. The stereotypes and biases that obese people are at risk for cardiovascular problems probably worked to get therapy for these people. This raises another consideration that people with equal, but less obvious risks may have been overlooked.

In the logistic regression of "Intervention", no characteristics of the patient, the setting or payment arrangements were significantly associated with a patient's getting appropriate treatment or follow-up. This is a noteworthy finding. No bias or discrimination appears to be influencing patient care.

Study purposes.

To address the study purposes, the first purpose, to assess whether treatments were meeting established standards of care was met. A clear picture of inadequate treatment emerged. The outcome of the second purpose, to discover what factors affected the ordering of treatments or follow-up, was not as obvious. No definitive factors were found which influenced general patterns of care, but some very significant associations with the likelihood of

getting behavioral interventions appeared. Obese patients were much more likely to get treatment, and Hispanics were much less likely. Further study of this important issue would be warranted.

IMPLICATIONS

General implications:

This study had a significant finding of poor treatment of hypertensive patients. Many hypertensive patients were not given appropriate treatment as recommended by the National Institutes of Health, the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. The time and energy of very knowledgeable people and important health agencies went into the preparation of the JNV-V, and excellent-quality research was used as its basis. Putting its recommendations into practice should be a priority for all physicians and practitioners. It was not clear from this study what the causes of failure were. There is a need for further study of these issues. There is a need to know what takes place during these physician office visits and what rationale the physicians have for not ordering the indicated treatments. There is a need to know what conditions would increase the likelihood of their ordering appropriate treatments.

Another implication of this study is to educate health care providers to recognize random opportunities when hypertensive people present themselves to the health care system and to be prepared to offer appropriate interventions, even if this is not the reason for the visit.

This study was an interesting way to look at treatments and follow-up for hypertension because the study sample was part of a very large, general survey. The practitioners who responded to the survey were not paying particular attention to any certain type of patient. This probably gave a more accurate look at typical care than if the survey was only looking at care of hypertensive patients.

The consequences of uncontrolled hypertension are severe, leading to serious disease and death. Health care providers should feel obligated to treat hypertension any time they discover it. The current study seems to support Stockwell's (1994) conclusion that "despite great technical advances with new medications, the process of care available in the community has not changed to any great extent, and treatment itself remains highly ineffective."

Implications of the theoretical model.

Imogene King's model of open systems and theory of goal attainment was an appropriate guide for the current study, except that the model focuses on the process, but not final outcomes.

For the open systems model, there were certainly characteristics of each patient, the health-care setting and the larger society which impacted the interactions between physician and patient. Obesity and smoking status,

race and ethnicity were examples of individual patient characteristics which seemed to affect care, at least according to the frequency distributions and correlations. Insurance and payment arrangements were characteristics of the interpersonal systems which seems to have affected care in some way. Then the larger social system considerations of National health coverage through Medicare and Medicaid as well as the work of many government agencies which went into the study of hypertension treatments also had some impact on care.

According to King's theory, the end product of the interaction is the final attainment of the mutual goal between patient and provider. In this study, the goal would be control of blood pressure. This study does not provide any follow-up data or any mechanism to determine if this goal was met. However, we can use the model to the point of the interaction between patient and provider. We must assume that if a correct treatment was never given or ordered for a patient, that it would be most difficult for that patient to achieve the goal of control of hypertension. And we must assume that if follow-up is not ordered or provided, it would not be possible to assess goal attainment. Perhaps a further study, a cohort study, could provide the necessary information about goal attainment. This limitation of the current study should not preclude using the King theoretical model to the point

of ordering or providing appropriate treatment and follow-up. King's theory should certainly be used to influence the perceptions and judgements of caregivers to be more aware of hypertensive patients in their caseloads. Providers should be routinely screening for hypertension and treating it when found.

Nothing about the interaction is known from the survey. The Health Belief Model (Rosenstock, 1966, 1974) could be applied to the interaction, to involve the patient in the care process and increase the likelihood that treatments would be followed. The important concepts of the Health Belief Model are that if a person believes that he or she is susceptible to a disease, that the disease is serious, and that the perceived benefits of action outweigh the perceived barriers or costs (such things as time, money, effort), the person will take action to avoid the disease.

Implications for practice.

This section is intended for nurse practitioners, as this is the focus of the study. However, the implications would also apply to physicians or other practitioners who see patients in office-based settings.

1. This study should help providers be aware that any patient may have hypertension. The patients involved in the study came to the physicians' offices for a variety of

reasons, not necessarily problems associated with hypertension. During these first visits to a physician, these patients were discovered to have hypertension.

2. The provider should be ready with a pre-planned screening mechanism to check all patients for hypertension, regardless of their presenting complaints or reason for the visit. Taking blood pressure readings on all patients is very quick and easy, and need not be done by the physician. it should be an automatic part of every office visit and can be done by a nurse or medical assistant. The JNC recommends routine blood pressure screenings.

3. The provider should be ready with an automatic protocol to follow for any patient discovered to have hypertension. This should include appropriate treatment and follow-up even if hypertension was not the reason for the visit. If the provider does not have extra time to initiate the treatments at the initial visit, he or she should order them and should certainly have the patient come back for follow-up. Anything less should be considered malpractice, given the risks to the patient of uncontrolled hypertension.

4. The provider should communicate to each patient the serious effects of uncontrolled hypertension. And the provider should educate each hypertensive patient about the condition and its chronic nature. This should increase

each patient's likelihood of expecting and seeking adequate, appropriate treatment and follow-up.

5. This study should help reduce biases that only certain types of patients are referred for appropriate care. The final regression analysis shows that no patient characteristics of race, ethnicity, gender or age affected their getting appropriate care, and no type of insurance or payment arrangement affected appropriate care.

6. Although the final regression showed no biases, there was a very significant finding that Hispanics were far less likely to receive appropriate behavioral counseling to reduce hypertension. Although it may not have been overt bias, it shows a disturbingly significant problem. Perhaps the healthcare settings which Hispanic people have access to are somehow deficient. Regardless, this study shows that Hispanic people are at increased risk of not having their hypertension adequately treated. This places them at higher risk for cardiovascular disease and death, a significant national public health problem. Although the numbers of Hispanic people in this study were small, the regression analysis shows that this effect is statistically significant and could not have occurred by chance or sampling abnormalities. This problem should certainly be addressed by further study and definitive action.

7. Obese patients were three times as likely to get behavioral treatments. This triggers two considerations.

First, obese patients are the most likely to get appropriate treatment. Obesity is a very obvious risk factor for cardiovascular disease. It fits providers' stereotypes of people with high risks. Obesity is easy to recognize and difficult to ignore. It induces physician action. The second consideration is that hypertensive patients who have risk factors which are not so obvious may be overlooked or forgotten. They may have risks which are equally high, but not so obvious -- perhaps a sedentary lifestyle or a diet high in saturated fats. The implication is that providers should continue to treat those with obvious risks, but they should also evaluate hypertensive patients for any risk factors, and give appropriate treatment as needed.

8. The main limitation of appropriate care seems to be a provider's willingness to give or order correct treatments and follow-up. Providers should give careful thought to providing appropriate antihypertensive care to all of their patients in general. Each provider could establish a personal "scorecard" method of increasing his or her percentage of appropriate treatments and follow-up for hypertensive patients. Perhaps provider characteristics which affect appropriate treatment should be studied. It would be helpful to know what causes a provider to order treatments or not. Any provider deficits could be addressed through training or incentives.

9. Smoking status was listed as "unknown" for greater than 25 percent of these hypertensive patients. Providers should certainly be asking their hypertensive patients if they smoke, as it is a major risk factor for cardiovascular disease. It is difficult for providers to order the appropriate smoking cessation therapy if smoking status is unknown.

10. Nurse practitioners are trained to look more wholistically at their patients than physicians are trained to do. If the patients in this survey had been viewed more wholistically, perhaps their likelihood of getting appropriate treatment would have been greater. In general, physicians are trained to treat the presenting problems only. Nurse practitioners are trained to look at the whole person, screen for likely risks at each age group, and offer more education and counseling types of interventions.

Limitations of the study.

One major limitation of the National Ambulatory Medical Care Survey is that it only provides a one-visit look at each patient. And the information about each patient is limited. Patients were not followed over time. The survey did not give physical data about each patient, blood pressure readings, history or current health status. The survey did not measure the adequacy of treatments or report any follow-up or eventual control of blood

pressures. It did, however, allow the quantification of treatments and the ordering of follow-up.

Another major limitation is that the quality or content of any counseling or educational programs was not stated. The effectiveness of these therapies was unknown. The current study simply assumed that all these therapies were correct and appropriate, although they may not have been. The study only measured whether or not these things were ordered or given. And when antihypertensive medications were ordered, the current study assumed that they, also, were correct and appropriate, though they may not have been. The codings and allowances were extremely generous, always assuming that correct things were being done. This may have distorted the study findings, counting care as appropriate when it was not.

Another major limitation of the current study is that the results only apply to the providers and patients who were surveyed in 1992. The verifications, data entry and computer work took almost three years. The results were not released until October, 1995. The results may no longer be an accurate representation of current practice. Although the recommendations for lifestyle modifications had been made by the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure were made over twenty years ago, they have been receiving more attention in recent years. Patients and physicians in 1992

may not have been as aware of appropriate treatment of hypertension as they are currently. The results of the original survey and the current study should not be automatically extended to the current general population.

A limitation of both the original survey and the current study is that most variables are dichotomous. For both of the outcome variables, various treatments and follow-ups were coded, counted and recoded into dichotomous variables of yes or no for getting appropriate care and, or follow-up. It would perhaps have been more accurate to place these outcome variables on scales of appropriateness if more information about the patients and the treatments were available. The dichotomous coding certainly provides only a rough measure of appropriate treatment.

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APPENDIX A

Definitions of certain terms used in this study:

Office(s): Premises that the physician identifies as locations for his or her ambulatory practice. Responsibility over time for patient care and professional services rendered there generally resides with the individual physician rather than any institution.

Visit: A direct, personal exchange between ambulatory patient and the physician (or members of his or her staff) for the purpose of seeking care and rendering health services.

Ambulatory patient: An individual presenting for personal health services, neither bedridden nor currently admitted to any health care institution on the premises.

Patients (in-scope): All patients seen by the physician or member of physician's staff in physician's office(s).

Physician (in-scope): All duly licensed doctors of medicine and doctors of osteopathy currently in practice who devote most of their practice to caring for ambulatory patients at an office location.

The following section gives a brief description of each variable in the data survey:

Date of visit: The actual date of the patient visit to physician's office.

Age: Age of the patient in years.

Sex: Gender of the patient.

Race: Race of the patient, Black, white, Asian/Pacific Islander or American Indian/Eskimo/Aleut.

Ethnicity: Hispanic or not Hispanic.

Expected source of payment: Health maintenance or other prepaid medical plan, Medicare, Medicaid, other government payment, private or commercial payment, patient payment, no charge, other or unknown payment.

Referred: Was patient referred by another physician--yes or no.

Injury: Was the visit related to an injury--yes or no.

Smoking: Does the patient smoke cigarettes--yes, no or unknown.

Visit reason: Patient reasons for the visit. Three separate reasons could be coded for each visit. The codes are from a long list of possible reasons.

Diagnosis: The physician's diagnosis of the patient's condition, coded according to established medical coding from the International Classification of Diseases, 9th Revision, Clinical Modification. Up to three separate diagnoses could be coded for each patient visit. A

separate variable "Does this patient currently have hypertension?" was included in the data collection process, independent of the official diagnosis. All patients who were identified as having hypertension were included in this study, even if their first diagnosis was something other than hypertension.

Seen before: A coding of whether the patient had been seen before by the current physician--yes or no.

If yes: If the patient had been seen before by the current physician, was it for the same condition--yes or no.

Several codings applied to conditions that the patient currently had at the time of the visit: Depression, hypertension, hypercholesterolemia or obesity--yes or no for each of these. These coding of these conditions was separate from and/or in addition to the diagnoses previously coded.

Several variables concerned ambulatory surgical procedures, which were not relevant to the current study.

Several codings pertained to diagnostic screenings which were done during the office visit: Blood pressure taken, urinalysis, EKG at rest or during exercise, mammogram, chest x-ray, other radiological study, allergy testing, spirometry, Pap test, strep throat test, HIV serology, cholesterol measurement, hearing test, visual test, mental status exam. These were coded either yes or

no for these tests. The instructions were to check appropriate boxes for all services ordered or provided during this visit for the purpose of screening or diagnosis. The instructions went on to say that during a visit for a complete physical examination, several of the services may be ordered or provided. Each service should be marked. The physician was instructed to check "other" for any diagnostic or screening service ordered or provided but not included in the list, then the physician was instructed to describe the service on the line provided. The possible choices listed were: 1) None, 2) Blood pressure, 3) Urinalysis, 4) EKG - Resting, 5) EKG - Exercise, 6) Mammogram, 7) Chest x-ray, 8) Other radiology, 9) Allergy testing, 10) Spirometry, 11) Pap test, 12) Strep throat test, 13) HIV serology, 14) Cholesterol measure.

Many therapeutic services were coded if done or not done. These were therapy for: diet, exercise, cholesterol reduction, weight reduction, drug abuse, alcohol abuse, smoking cessation, family or social, growth or development, family planning, other counseling, psychotherapy, corrective lenses, hearing aid, physical therapy, other therapy or no therapy. These were coded yes or no. The physician was instructed to check all appropriate boxes for the listed services if provided or ordered during the visit. The physician was instructed that all forms of medication should be excluded as they are included in a

different section. It is very clear from the instructions that any and all non-pharmacological treatments be included, whether they were actually done at this visit or only ordered at the visit and done at a different time. This is important to the current study -- this means if treatments were not marked in this area, they were not done and were not ordered to be done. The possible choices for therapeutic services were listed by type. The first choice is for no therapy. Next, a list of counseling or educational services in focused areas was given: 1) Diet, 2) Exercise, 3) Cholesterol reduction, 4) Weight reduction, 5) Drug abuse, 6) Alcohol abuse, 7) Smoking cessation, 8) Family/social, 9) Growth/development, 10) Family planning, 11) Other counseling. Then a list of other therapeutic services was given: 1) psychotherapy, 2) Corrective lenses, 3) Hearing aid, 4) Physiotherapy or 5) Other therapy. If "Other therapy" was checked, the physician was instructed to specify the type.

Many codings were done for medications, if ordered during the visit. These were not relevant to the current study.

Disposition of the visit was coded for the following choices: No follow-up planned, return at a specified date or interval, return if needed, telephone follow-up, referred to other physician, returned to referring physician, admit to hospital or other disposition. These

were coded yes or no. The instructions to the physician in this area were: "Eight codes are provided to describe the physician's disposition of the case on this visit. The physician should mark as many categories as apply." Then the choices were: 1) No follow-up planned: No return visit or telephone contact is scheduled for the patient's problem on this visit; 2) Return at a specified time: The patient is told to schedule an appointment or is instructed to return at a particular time.

3) Return if needed, PRN: No future appointment is made, but the patient is instructed to make an appointment with the physician if the patient considers it necessary (PRN, pro re nata, as necessary, as the occasion arises.) 4) Telephone follow-up planned: The patient is instructed to telephone the physician on a particular day (to report on this progress, or if the need arises, if he has any trouble or wishes further consultation). 5) Referred to other physician: The patient is instructed to consult of seek care from another physician. The patient may or may not return to this physician at a later date. 6) Return to referring physician: The patient was referred to this physician and is now instructed to consult again with the physician who referred him. 7) Admit to hospital: Patient is instructed that further care or treatment will be provided in a hospital. No further office visits are expected prior to that admission. 8) Other: Any other

disposition of the case not included in the above categories. The physician was instructed to specify what other disposition was given.

The duration of each visit was given in minutes of time spent actually with the physician. The physician was instructed to not include the time the patient spent waiting to see the doctor and not to include the time the patient spent receiving care from someone other than the doctor.

Patient weight was given for each case, as an integer, to produce national estimates from sample estimates.

Geographic region of the location of the physician's practice was coded for northeast, midwest, south and west U.S., and whether the location was in a metropolitan area or not.

Then, data was given about each physician: type of specialty, type of doctor (M.D. or D.O.).

APPENDIX B

Marginal Data.

For visits to aggregated specialties in 1992, any estimate less than 676,000 has a relative standard error that is greater than 30 percent. Such an estimate is considered unreliable accordint to the standards of the National Center for Health Statistics. For individual specialties the 30 percent relative standard error level varies. Separate listings of all the data categories, with numbers and percents of visits, was supplied with the NAMCS data. The instructions with this listing state that if any figure did not meet standards of reliability or precision, a star (*) would be placed with the figure. There were no stars in this listing, meaning that all the data used for this study met standards of reliability and precision.

APPENDIX C

University Committee on Research Involving Human Subjects Approval.