REPORT BY THE

Comptroller General

OF THE UNITED STATES

RELEASED

Public Representation On Boards And Blue Shield Allowances: Important Relationship Not Found

Is there an ascertainable difference in cost-containment efforts between Blue Shield plans with boards of directors apparently controlled by public representatives versus those with a majority of health care provider members?

Although influence or control is difficult to measure with any degree of certainty, GAO developed a statistical model to analyze, under certain assumptions, those factors--including board composition--which might be associated with the amounts which a plan would allow for selected physician services. The analyses showed that several factors were related to allowance levels, but board composition was not among those factors importantly associated with differences in allowances--GAO's measure of cost containment. GAO cautions that its analyses neither conclusively affirmed nor denied that public representation on the plans' boards of directors was importantly associated with the plans' cost-containment efforts.

HRD-81-31
DECEMBER 31, 1980

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-201262

The Honorable Gladys Noon Spellman
Chair, Subcommittee on Compensation
and Employee Benefits
Committee on Post Office and Civil
Service
House of Representatives

Dear Madam Chair:

This is in response to your Subcommittee's interest in public representation on Blue Shield plans' boards of directors. You asked us to determine if boards with lay majorities elected without medical society involvement had any ascertainable effect on cost-containment efforts.

Our review showed only limited associations between public representation and the plans' allowances.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

Comptroller General
of the United States

REPORT BY THE
COMPTROLLER GENERAL
OF THE UNITED STATES

PUBLIC REPRESENTATION ON BOARDS AND BLUE SHIELD ALLOWANCES: IMPORTANT RELATIONSHIP NOT FOUND

D I G E S T

GAO analyses neither conclusively affirmed nor denied that public representation on Blue Shield plans' boards of directors was importantly associated with the plans' cost-containment efforts.

According to GAO's analyses, public member representation on the plans' boards--measured five different ways--was rarely statistically significant in explaining differences in the amounts that 64 plans could pay to physicians in 1977 (customary allowances). Medical society influence, as GAO defined it, on board member selection also was rarely significantly related to these plans' 1977 customary allowances.

Neither public representation nor medical society influence, as defined in the analyses, was important in explaining differences in 1977 allowances for 45 plans which had only one geographic payment area. (See pp. 25, 26, 77, and 78.)

Other factors GAO examined were often significantly associated with differences in customary allowances. Analyses of the 64 plans showed that higher allowances were frequently associated with whether (1) the plans had a million or more subscribers and (2) income per capita was relatively high in the plan's service area. Frequently associated with lower allowances were increasing percentages of (1) area residents served by the plans and (2) physicians who had agreements with the plans.

GAO's analyses of the 45 plans which had only one geographic payment area each showed

believes this measure was a good indicator of plans' cost-containment efforts, it addresses only a measure related to price of health care services; it does not address quantity of services. Some plans could have chosen to emphasize other cost-containment approaches, such as strict claims review. The analyses would not have detected the effect of such an approach. (See pp. 13 to 15 and 17.)

GAO made the study using regression analysis. This method measures relationships among several factors simultaneously; it does not determine causality. (See app. V.)

GAO analyzed historical customary allowance levels for 17 health care procedures. These procedures accounted for approximately 11 percent of Blue Shield payments in the Federal Employees Health Benefits program in 1977. (See pp. 15 and 16.) GAO developed several ways of classifying public majority representation on a plan's board. Based on the Subcommittee's request, boards were classified as public if they had a public majority selected without medical society influence. GAO also developed four other classifications of public representation. Finally, GAO made analyses in which medical society influence in selecting board members was substituted for the original classification of public majority boards. GAO's findings are relevant only to these classifications; they are not proven relevant to a "public-control-in-general" factor. (See pp. 9, 18, and 19.)

GAO made extensive sensitivity analyses to determine whether changing certain factors or assumptions would alter the results. Based on GAO analyses, the basic conclusion remained--public representation on Blue Shield boards was not found important in explaining differences in the plans' customary allowances. (See pp. 18 to 21 and app. VIII.)

Tear Sheet

--classified as public were associated with higher 1977 allowances and

--subject to medical society influence on member selection were not associated significantly with differences in allowances.

Because of GAO's concerns about pooling data in the manner suggested by the Federal Trade Commission staff, GAO did not reach any conclusions regarding public representation or medical society influences on differences in allowance levels based solely on these analyses. However, based on its analyses of pooled data, GAO believes that multiple payment area plans represent an important factor in arriving at conclusions about the importance of medical society influence in explaining differences in allowance levels. (See ch. 4.)

Tear Sheet

Contents

ABBREVIATIONS

BLS	Bureau of Labor Statistics
FTC	Federal Trade Commission
GAO	General Accounting Office
HHS	Department of Health and Human Services
UCR	usual, customary, and reasonable

CHAPTER 1

INTRODUCTION

This report provides the results of analyses of the possible relationship between health insurance cost-containment efforts and different kinds of representatives serving on Blue Shield plans' boards of directors. We made the analyses at the request of the Subcommittee on Compensation and Employee Benefits, House Committee on Post Office and Civil Service. The Subcommittee was interested in whether there was any ascertainable difference in cost-containment efforts between plans that had boards of directors apparently controlled by public members and those that had boards apparently controlled by health care provider members.

INTEREST IN BOARD COMPOSITION

In addition to the Subcommittee, others have been interested in cost implications of Blue Shield plan board membership and selection processes. Such interest has been expressed in congressional hearings, by the Department of Health and Human Services (HHS), 1/ and the Federal Trade Commission (FTC). Researchers outside the Federal Government have been studying the question, and some State agencies have also addressed the issue.

Following hearings in March and April 1978, the Subcommittee on Oversight and Investigations, House Committee on Interstate and Foreign Commerce, reported in December 1978 that physicians and other health care providers dominated the boards of 44 of the 69 Blue Shield plans. The Subcommittee reported that (1) there was little effective State regulation of conflicts of interest on Blue Shield plans' boards of directors, (2) the national Blue Cross-Blue Shield Association provided little leadership in encouraging plans to eliminate conflicts of interest, (3) physicians on the boards of Blue Shield plans had inherent conflicts of interest, and (4) some nonphysicians on the boards also had conflicts of interest. The Subcommittee concluded that

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1/On May 4, 1980, a separate Department of Education commenced operating. Before that date, activities discussed in this report as conducted by HHS were the responsibility of the Department of Health, Education, and Welfare.

Blue Shield Association, Blue Shield plans covered about one in three Americans in 1977. The 70 Blue Shield plans provided coverage for almost 71 million persons through regular underwritten enrollment and earned subscription income of almost $11 billion. 1/

PAYMENT METHODS

Blue Shield plans generally have two methods of paying for physicians' services: The usual, customary, and reasonable (UCR) system bases claim payments on what physicians in the same locality charge; and the more traditional indemnity method reimburses doctors according to a set fee schedule. Most persons enrolled in Blue Shield plans had UCR coverage in 1977. One condition for plan membership in the national Blue Shield Association is development of a "paid-in-full program preferably based upon the usual, customary, and reasonable charges of physicians."

The membership standards of the Blue Shield Association define UCR as follows:

> "A usual fee is the most consistent charge by an individual physician or provider to patients for a given service.
>
> "A customary fee is a charge which falls within the range of usual charges for a given service billed by most physicians or providers with similar training and experience within a given area.

1/Blue Shield plans are frequently associated with Blue Cross plans, either in the public view or formally through various organizational structures. Blue Shield plans generally cover services provided by physicians; Blue Cross plans generally cover hospitalizations. Many of the Blue Cross and Blue Shield plans are formally affiliated. For example, Blue Cross and Blue Shield plans may have a single board of directors, a single chief executive, and a common location. However, the plans may not have any formal affiliation. In Pennsylvania, there is one Blue Shield plan that is not formally related to any of the five Blue Cross plans in the State.

--whether to establish a single geographic payment area or more than one,

--how often to update the UCR allowances, and

--whether to pay "participating" physicians at the same rate as others.

Physicians' usual charges are formally defined as their "most consistent" charges. In establishing UCR policy, plans' determinations of what is "usual" have varied. Plans have based their definitions of usual charges on (1) whatever the physician stated was his or her usual fee, (2) the charge a physician made at least a certain number of times, or (3) all the charges the physician submitted. Some plans did not use a usual fee in establishing reimbursement levels.

To be "customary," a fee must fall "within the range of usual charges for a given service billed by most physicians * * *." This standard leaves a plan considerable room for developing customary allowances. Most plans have set the customary allowance level at a point that will fully reimburse 90 percent of the charges (the 90th percentile), but others have set higher or lower percentiles.

A plan also must decide if it will set customary allowances to reimburse specialists differently from generalists. The Blue Shield membership standards appear to call for different reimbursement levels for specialists and nonspecialists in the reference to "similar training and experience" in the definition of "customary." However, some plans develop only one customary allowance for each procedure regardless of who performs the service.

Similarly, the Blue Shield Association's membership standards say that the customary allowances should be effective in a "given area." The standards leave the definition of "given area" to each plan, and plan policies vary considerably. In California, for example, the Blue Shield plan has established 28 payment areas where different customary allowances may be computed; Alabama has 6 such areas; and Mississippi has 1.

Plans also must decide how frequently to update their UCR allowances; this can affect how much reimbursement physicians are allowed. If physician charges are rising, the

Often this influence was mandated by the plans' bylaws. The bylaws of one plan, for example, said that a majority of directors shall at all times be persons approved by the State medical society. At another plan, both the State medical and hospital associations could nominate board candidates. (The plans whose board members' selection was subject to medical society influence are listed on p. 59.)

In addition to medical society influence, plan responses to our questionnaire showed that in 1977 State laws and/or plan bylaws for 43 plans required minimum percentages of board members to be health care providers. Twenty-six of these plans were legally required to have a provider majority on their boards.

In June 1977, public representatives on boards included bankers, union representatives, businessmen, farmers, retirees, and housewives. Like provider representatives, public representatives on the plans' boards have been selected in conformance with a number of different requirements. At 16 plans, medical societies could nominate, elect, appoint, or ratify public members of the plans' boards. Often the plans' bylaws established public representation. For example, one plan's bylaws directed that the board include members "who shall be representative of the interest of employers, employees, and the general public, one of which members shall be nominated by the [State] Farm Bureau Federation." Another plan's bylaws required that public members from consumer and labor groups be on the board. One plan's bylaws required that public board members not be licensed to practice medicine, unless they were employed full time in research.

State laws and/or plan bylaws, according to plan responses to our questionnaire, required certain amounts of public representation on the boards of 44 plans. Sixteen of these plans were required to have a majority of public representatives on the board. (The preceding information is summarized in tabular form on p. 59.)

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to find if there was an ascertainable difference in cost-containment efforts between Blue Shield plans that had boards of directors apparently controlled by public members and those that had boards apparently controlled by health care provider members. Chapter 2 presents our methodology and scope.

Board control

We defined as "public controlled" those plan boards with public majorities in 1977 whose public members had been chosen without the involvement of a State or local medical society. This definition was derived from the Subcommittee's request. Seventeen of the plans which responded to our questionnaire met this definition of public control. 1/

We made our study using a statistical method called regression analysis. Regression analysis enabled us to weigh simultaneously the relative association of several factors. Using this type of analysis we could determine if a plan's cost-containment efforts were related more to its board composition than, for example, to the malpractice insurance rates paid by doctors in the area or to income per capita in the area. 2/

Using regression analysis, we developed 17 equations, one for each of the selected 17 health care procedures. We then estimated variations in our cost-containment measure for each of the 17 health care procedures.

Other factors

Besides our basic measure of public control of boards, we included the following factors in our analyses of the differences in allowances:

--Percentage of residents which the plan covered.

--A measure of plan size.

--Income per capita in the plan area.

--Percentage of participating physicians in the plan area.

--The presence or absence of a UCR payment system.

1/Since our classification required public majorities, plans with equal public and provider member representation were not counted as public in this classification.

2/See appendix V for details on our regression analysis.

66 plans that responded to this question. The average percentage of participating physicians was about 66; in about half the plans more than 81 percent of area physicians participated, and in about half less than 81 percent participated.

5. UCR - whether a plan used a usual, customary, and reasonable payment system to reimburse participating physicians. Responses to our questionnaire showed that 54 plans used UCR systems and 12 plans used a fee schedule or some other system to set their reimbursement levels.

6. State malpractice insurance rates - the rates charged by the carrier conducting the highest percentage of a State's malpractice insurance business to physicians who may have performed major surgery. The rates applied to the coverage category paying $100,000 per single claim and $300,000 for a full year's claims. Responses to a Health Care Financing Administration survey showed that malpractice insurance rates in plan States ranged from $555 (North Carolina) to $14,900 (California) for States where the 66 plans we studied were located. On the average, malpractice insurance rates were about $2,504 for physicians who may have done major surgery; about half the plans were in States where the malpractice insurance rates were more than $2,562, and about half were in States where the rates were less.

7. Premium tax - whether a plan's premiums were subject to a premium tax in 1978. Our information showed that 26 of the Blue Shield plans were subject to this tax.

CRITERIA

For either the public control board factor, or any other factor, to be considered important in explaining variations in our measure of cost containment, we required it to meet two criteria. First, the factor had to be statistically significant in the regression analyses at the 0.95 level of confidence. Second, the factor had to attain statistical significance in at least 4 of the 17 separate equations.

example, lay or public members of a plan's board could feel intimidated by physicians' authority and therefore not state their positions on matters related to physician reimbursement. Also, members may simply not offer information that would adversely affect their situation. Improvements in medical technology or staff efficiency may lead to lower costs for some procedures, but the extent of these savings may never be raised and considered in setting allowances.

Because of the complexities of the issues, we did not study how and to what extent provider minorities are able to influence decisions of public members or control reimbursement policies covertly. However, in an attempt to clarify the questions asked by the Subcommittee, we tried to determine whether numerical representation--an admittedly questionable but feasible surrogate for potential influence--was associated with allowance levels in any way.

If a board had a majority of one group, we assumed that was the controlling group. The assumption that public and provider representatives exerted influence comparable to their numbers on the boards enabled us to associate the differences in board composition with differences in the other factors we wanted to examine.

Cost-containment efforts defined

The Subcommittee requesting this study was specifically interested in whether public majority boards elected without medical society involvement had any effect on plans' cost-containment efforts. To measure the effect different types of boards might have had, we had to define "cost-containment efforts." We selected as our measure of cost-containment efforts an indicator that was amenable to statistical analysis--the plans' highest allowable level of reimbursement. The allowable amounts were usually customary allowances. Whenever a plan had more than one customary allowance for a given procedure, we used the highest allowance.

Plan boards can make numerous decisions regarding the levels at which to set customary allowances. Selecting customary allowances as the measure of cost containment entailed the assumption that a plan board that was highly concerned with cost containment would make decisions which would result in lower customary allowances than a board that was not so concerned with cost containment.

We believe that the customary allowances we used in our analyses provide a good indication of cost containment at the plans. However, we realize that there are other measures which are also valid. Using the rate of change in the allowances over a period of time would have provided another approach. However, we did not obtain information to enable us to analyze rates of change over a period of years. 1/

We selected 17 health care procedures for which we obtained allowance information. The procedures were:

Surgery	Diagnostics
Appendectomy	Chest X-ray
Cholecystectomy	Electrocardiogram
Dilation and curretage	Blood urea nitrogen
Total hysterectomy	Hematocrit
Complete obstetrical care	Urinalysis
Surgical assistance at cholecystectomy	Pap smear
Anesthesia (note a)	**Doctors' visits**
Tonsillectomy	Consultation
Appendectomy	Intermediate hospital visit
Total hysterectomy	

a/Customary allowances for anesthesia procedures are usually derived differently from allowances for other types of procedures. In computing these allowances, plans used dollar conversion factors, which were multiplied by the sum of the relative value of anesthesia for a particular surgical procedure and the number of time units anesthesia was administered. Based on advice from our medical adviser and plan representatives, we computed allowance values for the anesthesia procedures using an estimated time for each procedure.

Our medical adviser assisted us in selecting the health care procedures used in our analyses. We selected relatively

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1/We did obtain allowances that were in effect in 1976. However, because our board composition and medical society influence factors are based on 1977 information, we did not use this information in the analyses presented in this report.

While our results enable us to say, for example, that plans with over 1 million members were associated with, or related to, higher customary allowances than other plans, we cannot say that plan size was a cause of higher allowances.

--Classifications of plans' boards: We developed five classifications of public representation on plans' boards (see pp. 18 and 19.) We did not attempt to reach a conclusion about the relation between our measure of cost containment and "public representation in general." The results of our analyses of public representation are therefore limited to these classifications.

--Number of health care procedures: Our sample of procedures was limited to 17 health care procedures.

--Lack of accurate information on quantity of health care services provided: Reliable measures of how often the 17 health care procedures were performed were not available. Therefore, we did not examine the relationship between board composition and revenue that physicians received from the plans. Thus, our conclusions are relevant only to the relation of board composition and differences in customary allowances for the health care procedures. The analyses do not address the issues of quantity or type of procedures performed, or the effect on the total bill for these procedures.

--Lack of adequate cost-of-living information: In many of our analyses we did not adjust dollar values to account for differences in cost of living in various plan areas. We did not make this adjustment because there was no adequate information on cost of living. Additional analyses we made suggested, however, that this limit did not affect our results; when we used several alternative measures of living costs, including these factors did not materially alter our results. (See apps. VII and VIII.)

--Study based on historical data: The information we obtained on board composition and allowances is relevant only to 1977.

Classification	Criteria
C	Boards that met the criteria in classification B and had a fee committee that was not directly controlled by health care providers; 5 of 64 boards met these criteria.
D	Unlike the other approaches that classified boards as public majority if they met certain criteria, this approach described each board by the percentage of its public members. The percentage of public members on boards ranged from 13 to 79.
E	Boards that had a simple majority of public members and/or those having equal provider and public representation that had a public chairperson; 22 of 64 boards met these criteria.

The table on the following page shows the locations of the 17 plans described by our basic board classification A. The 13- and 5-plan subsets shown on the table are two of the classifications we used in our sensitivity analyses.

Cost-of-living estimate

The primary cost-of-living index we used estimated the cost of living in the plan area in 1976. Additionally, we used two more cost-of-living indicators to adjust some of our dollar factors--for example customary allowances and income per capita--for differences in living costs from place to place. These indicators were the Bureau of Labor Statistics intermediate family budget series (1977) and the average selling price of previously occupied housing (1976). Sources for these data are given in appendix VI. (See p. 70.)

Medical society influence

In the analyses where we substituted medical society influence on board member selection for our public control factor, we defined medical society influence as a society's nominating, electing, ratifying, or in other ways directly influencing selection of members of plans' boards. The influence could be on either public or provider members, as contrasted with our board classification A, which excluded from the public control classification those boards where

medical societies influenced selection of public members. In 1977, 35 plans met our criterion for medical society influence. (See list on p. 59.)

Where we used the medical society influence factor, we used another factor to denote whether a Blue Cross and a Blue Shield plan were closely affiliated. We classified plans as closely affiliated if they shared headquarters location, boards of directors, executives, and staff. Based on this definition, 19 plans were closely affiliated in 1977.

ANALYSES OF 45 PLANS

Of the plans we analyzed, 45 had only one payment area each in 1977. We made alternate analyses using only this group of plans and used the same factors, definitions, and approaches as we had in our 64-plan analyses. For the 45-plan set we examined the relationship between our board classification A and our measure of medical society influence and differences in customary allowances. Because the results of our 45-plan analyses concerning public representation and medical society influence were consistent with the results of our 64-plan analyses, we did not make all the additional sensitivity analyses as we had done with the 64 plans.

Our reason for making this set of analyses was to examine the effect of excluding those plans with more than one payment area. We wished to examine this because of the question of which customary allowance is most appropriate to use when a plan has more than one such allowance. We believe that a highly appropriate indicator in plans with more than one payment area would be the weighted average of customary allowances based on the number of times the procedure was performed in each payment area. Lacking this information, however, we decided to exclude the 19 plans on which we had data from more than one payment area. 1/

A list of the plans we used in our 45-plan analyses follows.

1/In commenting on our draft, the FTC staff suggested that an appropriate solution to the "problem" of plans with more than one payment area would be using all the customary allowances which a plan had developed. For reasons discussed on page 32, we decided not to use this approach.

State	Plan headquarters
36. Washington	Bremerton
37. "	Seattle
38. "	Spokane
39. "	Tacoma
40. "	Wenatchee
41. West Virginia	Charleston
42. "	Clarksburg
43. "	Parkersburg
44. "	Wheeling
45. Wyoming	Cheyenne

SCOPE OF STUDY

We analyzed the relationship between public representation on boards of directors, other relevant factors, and the plans' customary allowances for 17 common health care procedures. We obtained information on board compositions, customary allowances, and other plan-related factors from the plans by questionnaire and interviews. We generally accepted information provided by the plans as accurate or corroborated changes with plan officials. We obtained data on other factors largely from publicly available sources.

Sixty-six plans completed and returned our questionnaires, which solicited information on plan boards and other characteristics. (See app. IV.) Our attempts to obtain information concerning the plans' established customary allowances for the 17 specified procedures required lengthy discussions with Blue Shield officials since they said plans considered such data proprietary and sensitive. After several months of negotiations, we were able (with assistance from these officials) to obtain sufficient information for our analyses from 64 of the plans.

We used customary or other maximum allowance information from 64 of 70 Blue Shield plans operating in 1977. The Puerto Rico plan was excluded since it is not in a State, and two others were excluded because they did not participate in the Federal Employees Health Benefits program. Another plan did not set customary allowances or pay claims, but acted as a coordinating organization for several member medical bureaus. The plan located in Detroit refused to give us the customary allowance information we sought. We did not use allowance

CHAPTER 3

PUBLIC REPRESENTATION ON BOARDS NOT FOUND IMPORTANT IN EXPLAINING DIFFERENCES IN ALLOWANCES

Public member representation on Blue Shield plans' boards, based on our analyses, was statistically significant in explaining differences in the 1977 customary allowances for very few of our selected health care procedures. Several other factors were significant in explaining differences in 1977 customary allowances for many of the procedures. Our analyses neither conclusively affirmed nor denied that public representation on plans' boards of directors was significantly associated with the plans' cost-containment efforts. (See app. V for the technical results of our 64- and 45-plan analyses.)

PUBLIC REPRESENTATION AND DIFFERENCES IN ALLOWANCES

Our 64- and 45-plan analyses indicated that allowances for only 2 of the 17 procedures we examined had a statistically significant relationship with our basic classification of board composition. The procedures were complete obstetrical care, including delivery (64-plan analysis) and consultation (45-plan analysis). The analyses showed that plans with public boards--those having public majorities whose public members were selected without medical society involvement--generally had higher allowances for these procedures than the other plans. A significant relationship between a board classified as public controlled and allowance levels for less than four procedures was insufficient evidence on which to base a finding that public representation was important in explaining differences in allowances.

PUBLIC REPRESENTATION ALSO NOT FOUND IMPORTANT IN SENSITIVITY ANALYSES

The results of our sensitivity analyses supported the conclusion of the two analyses: Public representation, no matter how we defined it or changed other assumptions, was rarely statistically significant in explaining differences in allowances. The medical society influence factor was

Plan size

Our 64-plan analysis showed that plan size (in this case, plans with 1 million or more members--"large plans") was also frequently related to differences in customary allowances. This factor was significant in explaining allowance differences in 7 of the 17 procedures we examined. 1/ Our analysis of the 45 plans with only one payment area showed plan size was a significant factor in explaining allowance differences for 1 of the 17 procedures. 2/ The analyses showed that plans with more than 1 million members generally had higher customary allowances for the noted procedures than plans of all other sizes.

Income per capita

Our 64-plan analysis showed that income per capita of plan area residents was significant in explaining allowance differences in 5 of the 17 procedures. 3/ Our analysis of the 45 plans showed this factor was statistically significant in explaining differences in allowances for three procedures. 4/ Plans where residents had higher income per capita generally had higher customary allowances for the procedures noted.

Participating physicians

Our 64-plan analysis showed that the percentage of physicians who had participating agreements with the Blue Shield

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1/The procedures with which plan size were significantly associated with customary allowances were cholecystectomy, dilation and curretage, total hysterectomy, complete obstetrical care, surgical assistance for cholecystectomy, and anesthesia for tonsillectomy and for appendectomy.

2/The procedure was anesthesia for appendectomy.

3/The procedures with which income per capita and customary allowances were significantly associated were appendectomy, cholecystectomy, total hysterectomy, complete obstetrical care, and anesthesia for total hysterectomy.

4/These procedures were cholecystectomy, total hysterectomy, and anesthesia for total hysterectomy.

The 45-plan analysis showed the same relationship, although the number of procedures that showed statistically significant associations with the malpractice insurance rate factor increased to four. 1/

Premium tax

Whether a plan's premiums were subject to a State tax was not important in explaining differences in customary allowances for either the 64- or the 45-plan analysis. This factor was statistically associated with no procedures in the 64-plan analysis and one procedure in the 45-plan analysis. In the 45-plan analysis, plans subject to a State premium tax were associated with lower allowances for consultations.

1/These procedures were appendectomy, anesthesia for tonsillectomy, anesthesia for appendectomy, and electrocardiogram.

medical (as opposed to provider) control, our analysis did not allow for differences in types of medical control.

We have clarified our report. Our basic analysis was primarily directed toward examining the relationship between customary allowance levels and public representation on boards (see classifications on pp. 18 and 19). 1/

FTC staff also noted that our medical society factor was a generalized measure of medical control over Blue Shield plan boards since it also included influence of participating physicians. The staff suggested that our measure could be more refined. We have made that adjustment. Boards are classified as subject to medical society influence only if a society had a clear function in the board selection process. We have not expanded our analysis to address different types of medical control since this was not the primary purpose of our study.

CLASSIFICATION OF BOARDS SUBJECT TO MEDICAL SOCIETY INFLUENCE

In response to the FTC staff's concern about how we classified medical society influence on certain boards, we altered our classification. Our reclassification was based on plan bylaws provided by FTC staff and on corroborating discussions with plan representatives. Our final classification of boards subject to medical society influence still differs in five cases from that used by the FTC staff. 2/

1/Our classifications of "public" and "medical society influenced" boards overlap as they relate to certain plans. Boards defined as public for purposes of the analyses in chapter 3 are those having public majorities whose public members were selected without medical society influence. Boards defined as having medical society influence for purposes of the analyses in appendix VIII are those whose provider and/or public members were selected with medical society influence. Of the 17 public boards and the 35 medical society influenced boards, 6 fit both categories.

2/To compare the effect of the different classifications, we made an analysis using the FTC staff classification. This change did not alter our results relative to medical society influence.

Selection of explanatory factors

FTC staff questioned our selection of explanatory factors. The staff said that deleting variables to reduce problems of multicollinearity 1/ and our inclusion of three endogenous variables 2/ could distort our results. Our further analyses undertaken as a result of the FTC staff concerns are discussed below.

Multicollinearity: We would agree with the FTC staff comment about multicollinearity if our primary purpose had been to develop a predictive model. Since our primary purpose was rather to determine the importance of public representation on boards in explaining differences in allowances, we gave our highest priority to assuring reliability in the board composition coefficients in our regression analyses. Because multicollinearity reduces the reliability of individual coefficients, while having no adverse effect on the equation's overall prediction, what one does about the problem depends on the main purpose of the study. For our study it was important to reduce the potential error due to multicollinearity.

Our draft report stated that we had excluded 17 factors due to multicollinearity. However, we had excluded 12 of these 17 factors for other reasons as well:

--Four factors had missing values for 10 to 12 of the plans.

--Five factors were frequently not statistically significant in preliminary regression analyses.

--Two factors were relevant only to Federal employee subscribers.

1/Multicollinearity occurs when two factors (independent variables) measure nearly the same thing. Intuitively, if the two factors are measuring nearly the same thing, the influence on the factor to be explained (dependent variable) may be attributed erroneously to one of the two explanatory factors.

2/Endogenous factors are those explained by the system under study. They are affected by factors within the system.

size and the percentage of residents covered had produced results of 0 and 1 procedures, respectively. 1/

Pooling

FTC staff, HHS, and the Blue Shield Association suggested that we consider "pooling" our data into a single equation rather than analyzing the effect various factors had on each of the 17 health care procedures.

We have reservations about pooling information in this manner. First, pooling obscures potential differences in results from procedure to procedure. Different conclusions could be reached using a single equation, pooled approach rather than a 17-separate-equations approach. Second, pooling results in an average composite allowance which has no real-world counterpart. This makes interpretation of results difficult. Third, occasionally data must be pooled to overcome shortcomings due to a low number of observations. Based on our number of factors, we believed we had an adequate number of observations. Fourth, pooling with the use of "dummy variables" requires constructing the equation in a manner which increases the likelihood that coefficients will be significant, compared to the procedure-by-procedure approach. 2/

1/The factor measuring the percentage of residents covered, Blue Shield market share, may not be endogenous. Our dependent variable was the allowance for each of 17 separate procedures. Blue Shield market share is a function of a Blue Shield plan's premium charge and service coverage relative to those of competing insurance companies. We believe that market share (percentage of residents covered) would be endogenous to any equation having Blue Shield premiums as a dependent variable. Since we used individual allowances and not premiums as our dependent variable, we believe market share could be included in our equation without contributing endogeneity. Similarly, plan size may be more associated with the potential universe of subscribers in the plan area rather than with the percentage of residents covered. None of our analyses of medical society influence included the factor measuring percentage of participating physicians.

2/Pooling our data in the manner FTC staff suggested required use of 16 "dummy variables" in addition to our explanatory variables.

We also analyzed the potential bias of including the plans having more than one geographic payment area in the pooled analyses. This changed the results for the medical society influence factor substantially. For the 45 single payment area plans, medical society influence could not be definitively called important in explaining differences in pooled composite allowances for all procedures. However, when multiple payment area plans were included in the analyses, medical society influence was significantly associated with higher pooled composite allowances for all procedures. Based on these pooled analyses, it appears that multiple payment area plans represent an important factor in arriving at any conclusion regarding the importance of medical society influence in explaining differences in allowances.

medical control of Blue Shield boards would not influence fee limits. The draft report, however, focuses on control by "public members" or "health providers," a term that includes physicians, dentists, hospital representatives, and others. It is not clear that findings regarding "health providers" in general apply to a more sharply defined group of providers, such as a medical society or an organized group of participating physicians, who share certain common interests.

Indeed, as the appended comments note, several studies have found that medical control of Blue Shield boards is an important factor in explaining differences in customary allowances across plans. Moreover, where the draft report does examine the effects of "medical influence," the analysis does not allow for differences in types of control.

Our second concern deals with the data used to measure "medical influence," as defined in the draft report. Our staffs' analysis indicates that GAO staff apparently relied on inaccurate data which led to the misclassification of a number of Blue Shield plans that should have been included with those subject to medical influence. This problem could well lead to substantially inaccurate results.

Finally, there may be certain technical differences in the draft report. The major areas of concern are (1) the use of only the highest fee screen per plan rather than using all of the available data on fee limits, (2) the methods used to select variables for inclusion and exclusion from the analysis, and (3) the relative merits of a statistical technique known as "pooling", a technique rejected by GAO staff. The first two concerns could substantially bias the results contained in the report. With respect to the final concern, the reasons advanced by GAO staff for rejecting "pooling" may not outweigh the benefits that could be obtained from using this approach.

The attached comments provide a more detailed discussion of these concerns and provide evidence and suggestions which may help in resolving them. We believe that several of these points have already been addressed at the staff level and are nearing resolution. We recognize that further work may be needed and our staff members will be available for

APPENDIX II

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
WASHINGTON D C 20201

REFER TO:

APR 15 1980

OFFICE OF THE INSPECTOR GENERAL

Mr. Gregory J. Ahart
Director, Human Resources
Division
United States General
Accounting Office
Washington, D.C. 20548

Dear Mr. Ahart:

The Secretary asked that I respond to your request for our comments on your draft report entitled, "Composition Of Blue Shield Plan Boards Not Important In Explaining Differences In Plans' Customary Allowances." The enclosed comments represent the tentative position of the Department and are subject to reevaluation when the final version of this report is received.

We appreciate the opportunity to comment on this draft report before its publication.

Sincerely yours,

Richard B. Lowe III
Acting Inspector General

Enclosure

Blue Cross
Association
Blue Shield
Association

840 North Lake Shore Drive
Chicago, Illinois 60611
312/440-6000

April 4, 1980

Mr. Gregory J. Ahart
Director, Human Resources Division
U. S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Ahart:

Attached is our comment, prepared by Mr. William Lynk of this office, to your draft of a proposed report concerning the composition of Blue Shield Plan Boards.

We appreciate the opportunity to comment.

Sincerely,

W. E. Ryan

William E. Ryan
Senior Executive Vice President

era
Attachment

APPENDIX III

II. GAO AND BSA ESTIMATION METHODOLOGY

Both GAO and BSA adopt a framework whereby allowance levels are treated as a function of board composition and of other explanatory factors. Both then statistically estimate with regression analysis the magnitude of these factors' effects on allowances. GAO's principal results, detailed in its Table III-1, are based on seventeen different estimates of its model; i.e., the model was estimated sequentially on allowance data for each of the seventeen medical procedures in the full sample. GAO's board composition factor is a measure of subscriber or "public" influence on the board; i.e., the converse of physician or provider influence. GAO finds that subscriber influence is generally associated with higher, rather than lower, allowance levels; this is the estimated effect in thirteen of the seventeen estimates, with the remaining four estimates suggesting lower allowances. However, only one individual estimate of this effect (one of the positive effect estimates) is judged to be statistically significant, so despite a strongly suggestive appearance of a general association between subscriber influence and higher allowances, GAO concludes that there is not enough statistical reliability in these estimates to warrant a discussion of any such possible tendency. GAO's primary emphasis is, therefore, on the lack of conclusive evidence of a relationship, rather than on the nature or direction of such a possible relationship.

The approach in BSA's study is similar, but with an important extension: rather than conduct seventeen disjoint tests, BSA combined all of the allowance data into a common sample and then performed a single estimate of its model. (Differences in allowance levels from procedure to procedure were accounted for by sixteen binary variables; details are available in BSA's submission to the FTC.) BSA found that the common effect over all procedures of subscriber board influence on allowance levels was positive, a finding consistent with the preponderance of the GAO results. It also found this estimated effect to be highly statistically significant, thus permitting a legitimate inference regarding the nature of the relationship between board composition and customary allowances.

The essence of the distinction between the two methodologies lies in the assumptions that govern the choice between the two. GAO, in its use of seventeen separate and disjoint estimates, assumes that the effect of the variable of interest -- board composition -- may differ substantially from procedure to procedure, and that therefore procedure-specific estimates may be appropriate. BSA, in its estimation of "the" effect of board composition, necessarily assumes that there does exist a single, uniform effect of this factor which is common to all procedures. If this assumption is validated, the pooled (i.e., all-procedure) estimate is generally to be preferred for reasons of statistical efficiency. If the assumption is not validated, however, then there is no practical recourse from separate procedure-specific estimates, since any attempt to measure "the" effect would be based on a false premise.

APPENDIX III

PROCEDURE	GAO ESTIMATES (DOLLAR EFFECT)	GAO ESTIMATES (PROPORTIONATE EFFECT)	BSA ESTIMATES (PROPORTIONATE EFFECT)
Complete Obstetrical Care	75.5**	.173	.351 (2.019)
Surgical Assistance, Cholecystectomy	-5.6	-.042	.065 (.345)
Anesthesia, Tonsillectomy	-6.2	-.076	.201 (1.084)
Anesthesia, Appendectomy	-5.3	-.044	.333 (2.023)
Anesthesia, Hysterectomy	-17.0	-.095	.338 (2.009)
Chest X-Ray	1.9	.073	.097 (.691)
Electrocardiogram	2.2	.087	.076 (.551)
Blood Urea Nitrogen	.71	.084	.013 (.074)
Hematocrit	.65	.132	-.049 (-.214)
Urinalysis	.84	.149	.091 (.507)
Pap Smear	.74	.065	.110 (.426)
Consultation	3.3	.050	.144 (.875)
Intermediate Hospital visit	3.9	.159	.504 (2.051)
Combined Estimate, All Procedures			.182 (3.981)

Significance Levels: t-ratios in parentheses (BSA estimates); ** indicates 95% significance level (GAO estimates).

APPENDIX III

IV. CONCLUSION

The present comparison suggests that the seeming differences between the findings and interpretations of the GAO and BSA studies are easily reconciled. Both studies find the same underlying relationship: non-subscriber (physician) control appears to be not important as to adverse (increasing) effects on Plans' customary allowances. BSA believes a further extension is shown; i.e., a tendency for subscriber control of Blue Shield Plan boards to be associated with higher, rather than lower, allowance levels. The only difference in these findings is in the precision with which this tendency was observed. Properly interpreted, therefore, both studies' empirical findings are mutually consistent, and each may be considered to indirectly confirm the other.

APPENDIX IV

U. S. GENERAL ACCOUNTING OFFICE

SURVEY OF BLUE SHIELD PLANS

I IDENTIFICATION

1. Please indicate the official name of your plan.

_____

_____

2. Please indicate the name, title and telephone number of the individual who can be contacted if further information is required.

_____ (Name)

_____ (Title)

_____ (Area code) (Telephone number)

3. About what per cent of all persons residing in your area are covered by Blue Shield (exclusive of Medicare and Medicaid)?

_____%

(Mean = 37)

(Range = 5-80)

II BOARD OF DIRECTORS

4. Indicate the number of members and the number of vacancies (if any) on your Blue Shield Board of Directors as of June 1, 1977. Do this for each member category as listed below. A given member should be included in only one category.

Member category	(Mean) Number of 1- Members	2- Vacancies
(1) Physicians	11.3	.1
(2) Osteopaths	.2	--
(3) Dentists	.0	--
(4) Other licensed providers	.1	--
(5) Hospital representatives	2.0	--
(6) Public representatives	10.8	.5
(7) TOTAL	25.3	.7
(8) GRAND TOTAL		26.0

5. Indicate the current number of authorized board members (number of members and vacancies) for all provider/hospital representatives combined (member categories (1) - (5)) and for the public representative category.

(1) Provider/hospital representative (Mean = 14.1)

(2) Public representative (Mean = 11.2)

6. During the last 10 years has the relationship between these two numbers (one being greater than the other or both being equal) always been this way? (Check those which apply and fill in where appropriate)

1-[45] Yes

2-[14] No, _____ years ago the relationship was reversed

3-[3] No, _____ years ago the numbers were equal

(4 plans provided "other" answers.)

APPENDIX IV

8. **Are there any State laws or regulations which govern the composition of your Board? (Check one)**

1-/42/ Yes (GO TO QUESTION 9)

2-/24/ No (GO TO QUESTION 12)

9. **Do State laws or regulations require that your Board be composed of a certain number of individuals? (Check one and fill in where appropriate)**

1-/34/ No

2-/1/ Yes, the Board must have _____ members

3-/15/ Yes, the Board must have at least _____ members

(16 plans provided no answer or "other" answers.)

10. **Do State laws or regulations require that a certain per cent of the Board members come from given occupational categories? (Check <u>those</u> which apply and fill in where appropriate)**

1-/37/ No

2-/15/ Yes, at least _____% must be physicians or osteopaths

3-/2/ Yes, at least _____% must be licensed providers other than physicians or osteopaths

4-/5/ Yes, at least _____% must be hospital representatives

5-/20/ Yes, at least _____% must be public representatives

(Some plans provided more than one answer.)

11. **Are there any other State laws or regulations, other than those mentioned in Question 9 and 10, which rule on the composition of your Board? (Check one)**

1-/39/ No

2-/11/ Yes (Please briefly specify or attach relevant excerpts)

(16 plans did not answer this question.)

APPENDIX IV

15. What selection procedure is used to place new individuals in the provider/hospital representative categories on the Board? (Check one)

1-[63] All of these members are selected through a nomination and/or election procedure

2-[3] All of these members are selected through an appointment and/or ratification procedure

3-[1] Some are selected by the procedure in #1, others are selected by the procedure in #2

16. For each group listed below indicate the role it plays in the selection of new provider/hospital representative members for the Board. Does it nominate, elect, appoint, ratify, perform some other function (specify) or have no function at all in selection? (Check one or more boxes for each group.)

	(1) Nominates	(2) Elects	(3) Appoints	(4) Ratifies	(5) Other (specify)	(6) No Function
(1) Entire Board	10	30	--	4		27
(2) Committee composed of all categories of Board members	36		--	--	2	29
(3) Committee composed of provider/hospital representative Board members	5	2	--	--	--	60
(4) Committee from state or local medical society	21	18	2	1	7	32
(5) State or local officials	1	--	--	--	--	65
(6) Other (please specify) _____ _____	8	20	1	--	1	44

(Rows may add to more than 66 because boards, committees, etc., may have more than one function)

17. What selection procedure is used to place new individuals in the public representative category on the Board? (Check one)

1-[63] All of these members are selected through a nomination and/or election procedure

2-[3] All of these members are selected through an appointment and/or ratification procedure

3-[0] Some are selected by the procedure in #1, others are selected by the procedure in #2

18. For each group listed below indicate the role it plays in the selection of new public representative members for the Board. Does it nominate, elect, appoint, ratify, perform some other function (specify) or have no function at all in selection? (Check one or more boxes for each group.)

	(1) Nominates	(2) Elects	(3) Appoints	(4) Ratifies	(5) Other (specify)	(6) No Function
(1) Entire Board	12	34	2	5	1	19
(2) Committee composed of all categories of Board members	40	1	--	--	1	25
(3) Committee composed of provider/hospital representative Board members	1	1	--	--	--	65
(4) Committee from state or local medical society	9	12	1	1	1	30
(5) State or local officials	3	3	1	--	--	62
(6) Other (please specify) _____ _____	7	19	--	--	2	43

(Rows may add to more than 66 because boards, committees, etc., may have more than one function)

APPENDIX IV

25. How is the customary allowance computed? (Check one and fill in where appropriate)

1-/54/ By computing the _____ (fill in) percentile of the physicians "usual" charges (customary area/specialist fee)

2-/ 3/ Fee schedule set by _____

_____

_____

3-/ 5/ Other (Please specify) _____

_____

26. When were customary allowances last updated?

(Varies at plans)

_____ _____ _____
(Month) (Day) (Year)

27. As a matter of policy, how often are your customary allowances updated? (Check one)

1-/38/ Annually, usually on

_____ _____
(Month) (Day)

2-/16/ Semi annually, usually in

_____ _____
(Month) (Day)

and

_____ _____
(Month) (Day)

4-/--/ Monthly

5-/--/ More frequently than monthly

6-/ 5/ No set policy (Please specify)

_____

_____

_____

(5 plans' policies called for quarterly updates; 1 plan's policy called for biennial updates; and 1 plan's policy called for triennial updates.)

28. Does your State in any direct way restr[illegible] increases in your customary allowances t physicians? (Check one)

1-/61/ No

2-/ 3/ Yes, (Please explain) _____

_____

_____

Table 3

Summary of Board Composition Information

LOCATION	BOARD CATEGORIES A	B	C	D (%)	E	MEDICAL SOC. INF.	PUBLIC REQUIRED MINIMUM	MAJORITY	STATE LAW (%)	PLAN BY-LAWS (%)	PHYSICIANS REQUIRED MINIMUM	MAJORITY	STATE LAW (%)	PLAN BY-LAWS (%)
ALABAMA	X	X	X	54	X	X	X	X	-	51	X	-	-	44
ARIZONA	-	-	-	29(A)	-	-	X	X	-	51(A)	-	-	-	-
ARKANSAS	X	-	-	52	X	X	X	X	-	52	X	-	-	48
CALIFORNIA	-	-	-	39	-	X	X	-	33	33	-	-	-	-
COLORADO	X	-	-	55	X	-	X	X	51	-	X	-	X	33
CONNECTICUT	-	-	-	50	X	-	X	-	-	50	X	-	-	50
DELAWARE	X	X	-	79	X	-	X	-	-	5	-	-	-	-
DISTRICT	-	-	-	44	X	-	-	-	-	-	X	-	-	50
FLORIDA	-	-	-	36	-	X	X	-	-	22	X	X	51	22
GEORGIA(ATLANTA)	-	-	-	19(A)	-	X	X	-	33	33(A)	X	X	67	67
GEORGIA(COLUMBUS)	-	-	-	13	-	X	-	-	-	-	X	X	51	-
HAWAII	X	X	X	56	X	-	X	X	-	51	-	-	-	-
IDAHO	-	-	-	27	-	-	X	-	-	8	-	-	-	-
ILLINOIS	X	X	-	72	X	-	X	X	67	67	-	-	-	-
INDIANA	-	-	-	20	-	X	-	-	-	-	X	X	-	51
IOWA	-	-	-	29	-	-	-	-	-	-	X	X	51	-
KANSAS	-	-	-	50	-	-	X	-	-	50	X	-	-	50
KENTUCKY	-	-	-	44(C)	-	-	X	X	-	53(C)	X	-	-	47
MAINE	-	-	-	56	X	X	X	X	51	51	-	-	-	-
MARYLAND	X	-	-	52	X	X	X	-	-	43	X	-	-	43
MASSACHUSETTS	-	-	-	52	X	X	X	-	33	33	X	-	-	33
MICHIGAN	X	X	X	61	X	-	X	X	14	58	X	-	14	42
MINNESOTA	-	-	-	33	-	X	X	-	33	33	X	X	-	67
MISSISSIPPI	-	-	-	41	-	-	X	-	-	-	X	X	-	41
MISSOURI(K.C.)	-	-	-	39	-	X	X	-	-	39	X	X	-	41
MISSOURI(ST.LOUIS)	-	-	-	33	-	-	X	-	-	33	X	X	-	67
MONTANA	-	-	-	38	-	X	X	-	-	39	X	X	-	61
NEBRASKA	X	X	-	54	X	-	X	X	-	51	-	-	-	-
NEVADA	-	-	-	25	-	X	X	X	51(D)	-	X	X	-	51(D)
N. HAMP/VERMONT	X	X	-	55	X	X	X	X	51	55	X	-	-	45
NEW JERSEY	X	-	-	57	X	-	-	-	-	-	-	-	-	-
NEW MEXICO	-	-	-	33	-	X	X	-	25	33	X	X	-	67
NEW YORK(ALBANY)	-	-	-	44(E)	-	-	X	-	50(E)	50(E)	X	-	50	50
NEW YORK(BUFFALO)	-	-	-	50	-	-	X	-	50	50	X	-	50	50
NEW YORK(N.Y.C.)	X	X	-	74	X	X	X	X	75	75	X	-	-	25
NEW YORK(ROCHESTER)	-	-	-	50	X	-	-	-	-	-	X	-	-	50
NEW YORK(SYRACUSE)	-	-	-	48(F)	-	X	X	-	50(F)	50	-	-	-	-
NEW YORK(UTICA)	-	-	-	50	X	X	X	-	50	-	-	-	-	-
N. CAROLINA	X	X	-	52	X	X	X	X	-	52	X	-	-	48
N. DAKOTA	-	-	-	15	-	X	-	-	-	-	-	-	-	-
OHIO(CLEVE)	X	X	X	67	X	-	-	-	-	-	-	-	-	-
OHIO(HUNTINGTON)	-	-	-	40(G)	-	X	X	-	-	43(G)	X	X	-	57
OKLAHOMA	X	X	-	55	X	-	X	X	-	55	X	-	-	45
OREGON	-	-	-	33	-	X	X	-	33	33	X	X	-	67
PENNSYLVANIA	-	-	-	30	-	X	-	-	-	-	X	X	51	51
RHODE ISLAND	-	-	-	48(G)	-	X	X	-	-	50(G)	X	X	51	50
S. CAROLINA	X	X	X	67	X	-	-	-	-	-	-	-	-	-
S. DAKOTA	-	-	-	36	-	X	-	-	-	-	X	X	51	-
TENN.(CHATTANOOGA)	-	-	-	33	-	-	X	-	33	33	X	X	67	67
TENN.(MEMPHIS)	-	-	-	25(G)	-	-	X	-	33(G)	-	X	X	67	-
TEXAS	-	-	-	31	-	-	-	-	-	-	-	-	-	-
UTAH	-	-	-	50(G)	-	X	X	X	-	53(G)	-	-	-	-
VIRGINIA(RICHMOND)	-	-	-	33(H)	-	X	X	-	-	47(H)	X	X	-	53
VIRGINIA(ROANOKE)	-	-	-	33	-	-	-	-	-	-	X	X	51	51
WASH.(SEATTLE)	-	-	-	36	-	X	-	-	-	-	-	-	-	-
WASH.(WENATCHEE)	-	-	-	36	-	-	-	-	-	-	-	-	-	-
WASH.(BREMERTON)	-	-	-	33	-	-	X	-	-	33	X	X	-	67
WASH.(SPOKANE)	-	-	-	25	-	-	-	-	-	-	-	-	-	-
WASH.(TACOMA)	-	-	-	14	-	-	-	-	-	-	-	-	-	-
W.VA.(CHARLESTON)	-	-	-	24	-	X	-	-	-	-	X	X	51	-
W.VA.(PARKERSBURG)	-	-	-	36	-	X	X	-	-	49	X	X	51	51
W.VA.(WHEELING)	-	-	-	42	-	X	-	-	-	-	X	X	51	51
W.VA.(CLARKSBURG)	-	-	-	40	-	-	-	-	-	-	-	-	-	-
WISC.(MILWAUKEE)	-	-	-	36	-	X	-	-	-	-	-	-	-	-
WISC.(MADISON)	-	-	-	42	-	X	X	-	-	47	X	X	-	53
WYOMING	X	X	-	53	X	-	-	-	-	-	-	-	-	-
TOTALS	17	13	5	NA	22	35	44	16	NA	NA	43	26	NA	NA

(A) BLUE CROSS AND BLUE SHIELD OF ARIZONA UNTIL JUNE 1, 1977, WAS MADE UP OF TWO CORPORATIONS. BY-LAWS AND MERGER EFFECTIVE JUNE 1, 1977, PROVIDE FOR AN ORDERLY DECREASE TO A 25-MEMBER BOARD WITH A MAJORITY OF PUBLIC MEMBERS.

(B) OF ELEVEN AUTHORIZED PUBLIC REPRESENTATIVES (33 % OF THE BOARD), SIX POSITIONS WERE VACANT.

(C) RESULTS FROM GAO'S RECLASSIFICATION OF THREE BOARD MEMBERS AS PROVIDERS; TWO REPRESENTATIVES WERE AFFILIATED WITH A MEDICAL SCHOOL OR WITH A MEDICAL ASSOCIATION. A THIRD HAD MEDICAL TRAINING.

(D) STATE LAW SIGNED MAY 3, 1977, REQUIRED THAT A MAJORITY OF THE BOARD SHALL BE PERSONS WHO ARE NOT PHYSICIANS OR DULY APPOINTED REPRESENTATIVES OF PHYSICIANS. PHYSICIANS ON THE BOARD WERE ALLOWED TO COMPLETE THEIR TERMS. PLAN INDICATED BY-LAWS MAY BE CHANGED TO CONFORM WITH LEGISLATION.

(E) GAO CLASSIFIED TWO DENTISTS AS PROVIDERS WHOM THE PLAN CLASSIFIED AS PUBLIC REPRESENTATIVES.

(F) GAO RECLASSIFIED AS PROVIDER REPRESENTATIVE A HOSPITAL COORDINATOR OF SOCIAL SERVICES WITH MEDICAL TRAINING.

(G) PLAN HAD ONE PUBLIC REPRESENTATIVE POSITION VACANT.

(H) ALTHOUGH PLAN RESPONDED THAT BY-LAWS REQUIRED 8 PHYSICIANS AND 7 LAYMEN, RESPONSE ALSO SHOWED BOARD COMPOSED OF 10 PHYSICIANS AND 5 PUBLIC REPRESENTATIVES.

2. We used a statistical technique similar to regression analysis, called correlation analysis, to determine if any of these other factors were redundant. Because using highly correlated factors in regression analyses produces unreliable estimates, we included in our analysis only factors that were not highly correlated with our measure of public representation or with each other. This procedure is explained in more detail in appendix VI.

3. We assumed that there was a linear relationship between board composition and other factors and differences in customary allowances. We had no theoretical reason to assume any other type of relationship.

4. We evaluated the coefficients that each regression analysis produced to identify the number of different procedures for which the board composition and each of the other factors were statistically significant in explaining differences in customary allowances. For each procedure we also tested to see if the group of factors as a whole was statistically significant in explaining differences in customary allowances, and we computed how much of the difference in customary allowances was explained by the public control factor alone.

The basic form of the relationship between the customary allowance levels and board composition and other factors we used in the 64- and 45-plan regression analyses was:

Customary allowance for each procedure = a constant term

+ coefficient #1 x income per capita
+ coefficient #2 x percent of population covered
+ coefficient #3 x does the plan have more than 1 million members 1/
+ coefficient #4 x does the plan use a UCR system 1/
+ coefficient #5 x malpractice insurance rate
+ coefficient #6 x is there a tax on Blue Shield premiums 1/
+ coefficient #7 x percentage of participating physicians
+ coefficient #8 x is the plan public controlled 1/

1/These factors are measured differently from the others. If the answer to any of the questions was "yes" for any plan, then that factor was given a value of 1 for that plan; if "no," then it was given a value of 0.

Table 4

Results of Regression Analyses Using 64 Plans and Board Classification A

Regression number/ procedure name	Constant term	Estimated coefficients (note a): Income per capita (note c)	Percent of residents plan covered	Plan size over 1 million	Plan had UCR system	Malpractice insurance rates (note c)	Plan subject to premium tax	Percent of participating physicians	Board classification A	F statistic for board composition	F statistic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b): Board classification A	Other explanatory variables	Unexplained
Surgery															
1. Appendectomy	213.7	55.4**	-1.9**	50.0*	13.8	6.7	9.2	-0.49	46.7	2.28	3.6***	64	6.8	28.0	65.2
2. Cholecystectomy	249.6	93.1**	-3.0**	91.5**	56.7	6.2	48.8	-0.57	62.1	1.81	4.4***	64	7.4	31.4	61.2
3. Dilation and curretage	120.2	15.8	-0.36	43.6**	29.8*	4.8	-5.0	-0.47**	6.0	0.15	4.9***	64	4.6	37.1	58.2
4. Hysterectomy	231.6	106.9**	-3.0**	115.1**	72.2	10.1	25.2	-0.64	77.7	2.76	5.8***	64	9.5	36.2	54.3
5. Complete obstetrical care	182.7	63.3**	-2.1**	67.3**	44.6	-0.20	21.4	-0.05	75.5**	5.93**	4.6***	64	14.2	25.8	60.0
6. Surgical assistant at cholecystectomy	47.2	20.1*	-0.60	30.2***	20.3	2.0	13.5	-0.12	-5.6	0.21	3.5***	61	0.57	34.6	64.8
Anesthesia															
7. Tonsillectomy	92.9	-4.7	-0.24	21.0***	18.1**	3.4**	1.4	-0.20**	-6.2	0.88	6.2***	62	0.25	48.3	51.5
8. Appendectomy	105.1	4.0	-0.53	32.6***	19.5	3.5	5.7	-0.27*	-5.3	0.26	5.5***	62	0.69	44.5	54.8
9. Hysterectomy	20.0	48.7**	-1.4**	24.5	28.7	1.7	3.4	-0.20	-17.0	0.55	2.4**	62	0.07	26.4	73.5
Diagnostics															
10. Chest X-ray	14.4	2.1	-0.02	0.20	2.1	0.51	1.6	-0.01	1.9	1.27	1.8	63	5.6	15.0	79.4
11. Electrocardiogram	20.3	0.68	-0.02	0.82	-0.79	1.1***	2.0	-0.01	2.2	1.61	2.1**	63	3.2	20.8	76.0
12. Blood urea nitrogen	10.7	0.06	-0.07***	-0.03	0.52	0.19	1.1*	-0.02**	0.71	0.93	5.2***	62	2.9	41.1	56.0
13. Hematocrit	4.3	0.11	-0.03	0.39	1.2	0.27	0.95	-0.02	0.65	0.78	2.9***	61	5.6	25.5	68.9
14. Urinalysis	5.5	0.00	-0.04*	1.0	1.1	0.20	0.92	-0.01	0.84	1.35	3.3***	64	5.9	26.3	67.9
15. Pap smear	11.8	0.41	-0.09**	1.9	2.9**	-0.01	0.57	-0.03*	0.74	0.36	4.1***	64	4.0	33.5	62.4
Doctors' visits															
16. Consultation	43.1	7.3	-0.10	8.3	1.6	2.2*	-6.0	-0.16**	3.3	0.34	3.3***	62	3.4	29.7	66.9
17. Intermediate hospital visit	18.6	2.2	-0.21**	-0.45	2.6	0.72	2.5	-0.01	3.9	1.62	1.9*	56	3.2	22.2	74.7

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Rows may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

* Significant at .90.
** Significant at .95.
*** Significant at .99.

APPENDIX V

METHOD FOR SELECTING FACTORS USED IN ANALYSES

We derived the explanatory factors used in our analyses as follows:

First, we identified 44 different factors that we thought might be related to differences in customary allowances.

Second, we established four different preliminary regression analysis models. Based on the results of about 200 preliminary multiple regression analyses, we eliminated nine factors. These factors were not identified as significant in explaining differences in allowances enough times to warrant further study.

Third, we eliminated six factors because using these factors reduced our number of valid observations.

Fourth, we excluded five factors which related to physician supervision of certain committees of boards of directors. We removed these factors from further analyses because: (1) they were highly intercorrelated, (2) there were few instances where any of the committees were not physician supervised, and (3) we included a measure of public representation on committees in one of our board classifications used in our sensitivity analyses. (See classification C, p. 19.)

Fifth, we excluded a factor which indicated whether or not a plan had the formal approval of a medical society. We had anticipated using this factor to indicate physician control. However, since Blue Shield standards require that all plans have either medical society approval, or some other indication of substantial support by the medical profession, we judged that this factor did not necessarily differentiate physician from public control among the plans. Moreover, we developed another measure of medical society influence.

Sixth, we eliminated the factor showing whether a plan's board chairman was a provider or public member. We did this because board chairmanship was already included in two of our board classifications. (See classifications B and C, pp. 18 and 19.)

We excluded two additional factors--the percentage of a plan's total group enrollment represented by Federal subscribers and the number of Blue Shield high option Federal contracts--because they were not relevant to our study.

Factors Eliminated Before Final Analyses

Nine factors excluded because they were not significant in enough early regressions

1. Plan location--central.
2. Whether or not the plan served the entire State where it was located.
3. Percentage of Medicare enrollees in plan area.
4. Highest marginal State income tax rate.
5. Percentage of plan area population located in a metropolitan area.
6. Population per physician in plan area.
7. Average selling price of houses.
8. The percentage of occupied hospital beds.
9. Regional annual average salary level for physicians.

Six factors excluded due to low number of valid observations

10. Percentage of persons 18 years old or younger in plan area.
11. Bureau of Labor Statistics (BLS) urban family budgets as cost-of-living estimates.
12. The percentile at which customary allowances were set.
13-15. Three measures of plans' having to pay a premium tax on subscription income. The three measures were (1) the percent of Blue Shield premium tax rate, (2) the difference between the percent Blue Shield premium tax rate and the percent paid by commercial insurers, (3) whether the commercial insurance premium rate was higher than the Blue Shield rate.

Nine factors excluded for other reasons

16. Medical society approval of a plan.
17-21. Plans having physician majorities on the following committees (each as a separate factor): fee committee, claims review committee, reasonable charge committee, UCR fee adjudication committee, and utilization review committee.
22. Whether the plan's board chairman was a provider.
23. Percentage of plan's total group enrollment represented by Federal subscribers.
24. Number of Blue Shield high option Federal contracts.

Five factors excluded due to high intercorrelations

25-27. Plan location--north, south, and west.
28. Frequency of customary allowance updates.
29. Whether a plan had more than one geographic payment area.

TABLE 7

Correlations Among Board Classifications and Other Factors in Analyses (note a)

	A	B	C	D	E	Medical Society Influence	1 Income Per Capita	2 Percent Covered	3 Plan Size	4 UCR	5 Malpractice Insurance Rates	6 Premium Tax	7 Participating Physicians	8 Affiliated	9 Cost of Living
Board Classifications (note b)															
Board A	1 00														
Board B	84	1 00													
Board C	49	58	1 00												
Board D	73	67	39	1 00											
Board E	83	70	40	78	1 00										
Medical Society Influence	21	22	19	21	17	1 00									
Other Factors (note c)															
1 Income per capita	15	14	05	25	18	10	1 00								
2 Percent of population covered	21	21	25	41	36	25	39	1 00							
3 Plan size over one million	17	13	16	25	18	02	32	19	1 00						
4 Plan had UCR system	28	23	14	20	08	19	14	03	00	1 00					
5 Malpractice insurance rates	05	05	01	05	08	03	30	18	13	10	1 00				
6 Plan subject to premium tax	09	15	12	19	15	24	02	02	02	18	09	1 00			
7 Percent of participating physicians	27	35	18	07	15	12	18	26	27	07	14	39	1 00		
8 Plan closely affiliated with Blue Cross (note d)	47	53	20	37	40	14	-24	-13	05	13	19	10	48	1 00	
9 Cost of living estimate (note d)	20	-01	03	33	31	08	54	42	26	03	17	09	20	23	1 00

[a] Numbers rounded to nearest hundredth
[b] Definitions presented on pp 18 and 19.
[c] Sources presented on p 70.
[d] Factors not included in basic analysis (see ch 3) but used in sensitivity analyses (see app VIII)

APPENDIX VI

DIFFERENCES IN GEOGRAPHIC LIVING COSTS

This appendix explains why we excluded differences in geographic living costs from our basic analysis, which estimates the relationship between customary allowances and public representation on boards and other factors.

DIFFERENCES IN GEOGRAPHIC LIVING COSTS CAN AFFECT CUSTOMARY ALLOWANCE LEVELS

If there are differences in geographic living costs--and all the data sources we reviewed support that there are--such differences can affect the levels of customary allowances established by individual plans. They can also affect other economic transactions, such as insurance rates, income levels, and housing values.

Differences in geographic living costs alter the purchasing power of the dollar. If a market basket of goods and services costs more in one area than in another, customary allowance levels, as well as other prices and wages, may be set higher in the first area so that the physicians there will be able to buy the same amount of goods and services that physicians in other areas can buy. Likewise, the dollars received from income, insurance settlements, housing sales, and other economic transactions may be greater in the first area than in the second so that purchasing power will be equivalent. Therefore, customary allowances, incomes, and all other dollar figures in each area should be adjusted to account for the differences in the dollar's purchasing power in each area. The adjusted figures can then be analyzed to see if there are any differences between them that exist for reasons other than the dollar's local purchasing power.

SOURCES OF GEOGRAPHIC LIVING COST DATA

To adjust customary allowances and other area economic transactions properly, reliable geographic living cost data are required. "The Measure of Poverty," an April 1976 HHS report to the Congress, examined extensively the sources of geographic living cost data. The report concluded that:

> "* * * practically speaking, only one statistical series provides current data about differences in living costs, the Family Budget series published by the Bureau of Labor Statistics [BLS]."

Given these serious problems with the series and the fact that BLS representatives have themselves questioned the series' accuracy, we did not include BLS data in our basic analysis. However, because of the emphasis living cost differentials have been given by other researchers, we used several estimates of living cost differentials based on the BLS series in our sensitivity analyses. However, using these living cost estimates did not substantially change our findings on the relationship between public representation and customary allowances.

Because of this inconsistency and because little difference existed between the rest of the results of the sensitivity analyses and those of the 64-plan analyses for all the other board classifications, we believe the evidence was insufficient to conclude public representation on boards was important in explaining differences in allowances.

Table 9

Results of Sensitivity Analyses Using Five Different Classifications of Boards and Changing Other Characteristics

	Number of procedures when the public representation factor was statistically significant in explaining differences in customary allowances for 17 procedures				
	Board classification (note a)				
Analysis	A	B	C	D	E
64 plans, 1977 allowances, no cost-of-living factor, and 0.95 confidence level	1	2	0	1	1
Change					
1. Cost of living as separate factor	0	0	0	0	0
2. 0.90 confidence level	1	6	0	5	2

a/See pages 18 and 19 for board classifications.

OTHER FACTORS' RESULTS SIMILAR TO THAT IN BASIC ANALYSIS OF PUBLIC REPRESENTATION

Although our primary interest was in the factors that measured public representation, we also reviewed the results of the sensitivity analyses for the factors other than those intended to classify the boards. Table 10 on page 76 summarizes these results. With only a few exceptions our sensitivity analyses showed results for the other factors similar to what we had found in our 64-plan analysis of public representation.

The most important factors in explaining differences in allowances in the 64-plan analysis of public representation were the percentage of residents covered, plan size, income per capita, and percentage of participating physician factors. (See ch. 3 and the basic analysis line in table 10.) With few exceptions, these factors were also the most important throughout our sensitivity analyses.

The 64-plan sensitivity analyses showed more change in the factor measuring malpractice insurance rates than in any of the other factors. Including a separate cost-of-living factor appeared to increase the number of times the malpractice factor was significant in explaining differences in allowances from two in the 64-plan public representation analysis to as many as 11 out of 17 procedures. (See table 10, change 1.) Although the cost-of-living factor itself rarely had a significant association with allowances, its inclusion may have helped isolate the relationship malpractice insurance rates had to "real" (i.e., those adjusted for cost-of-living differences) allowances rather than to the "nominal" allowances used in the basic analysis. 1/

MEDICAL SOCIETY INFLUENCE ON BOARD MEMBER SELECTION NOT FOUND SIGNIFICANTLY ASSOCIATED WITH DIFFERENCES IN ALLOWANCES

We replaced our measure of public representation with a measure of medical society influence on the selection of each plan's board members. We also replaced the factor that measured the percentage of participating physicians with a measure of the degree of affiliation between Blue Shield plans and Blue Cross plans. (See table 11 on p. 79. A list of the 35 plans that we classified as having medical society influence in selection of board members is on p. 59.) Although the plan with headquarters in Reno, Nevada, met the criteria indicated, it was not used in the analyses because we lacked necessary information about the plan.

1/However, when the measure of malpractice insurance rates was adjusted by two cost-of-living estimates in sensitivity analysis on the effect of medical society influence on board member selection, it never resulted in a significant relationship. (See table 11 on p. 79, changes 1b and 1c.) This fact, and the questions we had about the applicability of cost-of-living estimates (see app. VII), made us question our results on the association of malpractice insurance rates with allowances.

Table 11

Results of Sensitivity Analyses Using Medical Society Influence With Other Factors

Analysis	Number of procedures (out of 17) when factor was statistically significant in explaining differences in customary allowances								
	Percentage of residents plan covered	Plan size over 1 million	Income per capita	Blue Cross and Blue Shield closely affiliated	Plan had UCR system	Malpractice insurance rate	Plan subject to premium tax	Cost-of-living estimate	Medical society influence (note a)
64 plans, 1977 allowances, no cost-of-living factor, and 0.95 confidence level (note b)	5	10	5	10	1	2	3	-	0
Change									
1. a. Cost of living as separate factor	(c)	10	-	11	0	13	3	1	0
b. Allowances, income per capita, and malpractice insurance rates adjusted using a cost-of-living estimate based on home prices	10	7	16	12	0	0	4	-	0
c. Allowances, income per capita, and malpractice insurance rates adjusted using a cost-of-living estimate based on BLS data	11	10	5	10	0	0	3	-	0
2. 0.90 confidence level	10	11	8	11	2	4	5	-	1
3. Average customary allowances for multiarea plans	6	6	6	10	2	2	2	-	0
4. Allowances for 45 single payment area plans	4	2	3	6	4	1	0	-	1

a/Definition on page 19.

b/This analysis was the same relationship as that in chapter 3 except that a measure of medical society replaced board classification, and a factor representing the degree of Blue Shield and Blue Cross affiliation replaced the percentage of participating physician factor.

c/Hyphens show the indicated relationship was not tested.

APPENDIX VIII

Table 12

Results of Regression Analyses Using 64 Plans, Board Classification A, and Selected Explanatory Factors

Regression number/ procedure name	Estimated coefficients (note a) Constant term	Income per capita (note c)	Plan had UCR system	Malpractice insurance rates (note c)	Plan subject to premium tax	Board classification A (note d)	F statistic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b) Board classification A	Other explanatory variables	Unexplained
Surgery											
1. Appendectomy	194.2	32.2*	14.9	12.7*	24.4	55.8*(3.1)	2.5**	64	6.8	11.0	82.2
2. Cholecystectomy	215.2	62.5*	58.3	15.9	68.1	73.7(2.4)	3.2**	64	7.4	14.4	78.1
3. Dilation and curretage	83.2	15.3	25.5	6.2	8.8	20.3(1.4)	2.2*	64	4.6	11.6	83.8
4. Hysterectomy	178.3	82.7**	71.2	19.8*	47.0	93.9*(3.6)	4.4***	64	9.5	17.9	72.6
5. Complete obstetrical care	165.9	47.1*	47.0	6.8	26.0	76.2**(5.9)	4.1***	64	14.2	11.8	74.0
6. Surgical assistant at cholecystectomy	32.1	17.8*	16.4	4.0	16.0	-0.50(0.0)	2.2*	61	0.57	16.4	83.1
Anesthesia											
7. Tonsillectomy	77.9	5.8	16.2*	4.2**	7.2	-0.46(0.0)	2.3*	62	0.25	16.9	82.9
8. Appendectomy	85.1	0.33	17.3	5.3**	13.8	2.1(0.03)	1.7	62	0.69	12.2	87.1
9. Hysterectomy	91.1	30.5*	30.7	6.0	9.2	-15.0(0.44)	1.8	62	0.07	13.5	86.5
Diagnostics											
10. Chest X-ray	14.6	1.7	2.2	0.57	1.8	1.9(1.6)	2.8**	63	5.6	14.3	80.1
11. Electrocardiogram	19.8	0.49	-0.84	1.2***	2.2	2.4(2.2)	3.4***	63	3.2	19.7	77.1
12. Blood urea nitrogen	11.4	-1.3**	0.74	0.36*	1.6**	0.90(1.3)	2.7**	62	2.9	16.8	80.3
13. Hematocrit	4.0	-0.42	1.2	0.34**	1.3**	0.96(1.8)	2.8**	61	5.6	14.6	79.8
14. Urinalysis	5.0	-0.45	1.1	0.32*	1.3**	1.1(2.2)	2.6**	64	5.9	12.4	81.7
15. Pap smear	11.0	-0.91	3.0**	0.27	1.5	1.3(0.95)	1.7	64	4.0	9.1	86.9
Doctors' visits											
16. Consultation	33.1	6.3	-0.21	2.5*	-2.2	8.1(2.1)	2.3*	62	3.4	13.5	83.1
17. Intermediate hospital visit	21.0	-1.0	3.0	1.3**	3.0	2.9(1.0)	1.7	56	3.2	11.4	85.5

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Each row may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

d/F statistic in parentheses.

* Significant at .90.
** Significant at .95.
*** Significant at .99.

APPENDIX VIII

Table 14

Results of Regression Analyses Using 45 Plans and the Medical Society Influence Factor

Regression number/ procedure name	Constant term	Estimated coefficients (note a): Income per capita (note c)	Percent of residents plan covered	Plan size over 1 million	Plan had UCR system	Malpractice insurance rates (note c)	Plan subject to premium tax	Plans highly affiliated with Blue Cross	Medical society influence (note d)	F statisic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b): Medical society influence	Other explanatory variables	Unexplained
Surgery														
1. Appendectomy	229.1	22.7	-0.49	-4.7	29.7	12.8	-14.3	45.1**	-5.8(0.13)	2.2**	45	0.10	33.0	66.9
2. Cholecystectomy	276.4	67.0***	-1.7**	8.9	42.0*	12.7	-2.4	68.5***	-14.0(0.41)	3.5***	45	0.05	43.6	56.3
3. Dilation and curretage	75.5	11.2	0.13	15.7	27.5	4.7	-8.1	35.8**	6.6(0.26)	1.8	45	1.6	27.0	71.4
4. Hysterectomy	225.4	82.9***	-1.2	11.7	72.8	12.7	-15.4	72.9**	-24.8(0.79)	3.3***	45	0.44	41.6	57.9
5. Complete obstetrical care	126.1	51.9*	-0.72	38.3	48.2	16.4	1.4	73.2**	-2.0(0.01)	2.6**	45	0.00	36.7	63.3
6. Surgical assistant at cholecystectomy	78.0	15.4	-0.50	14.0	17.5	-2.8	-2.5	-0.02	-13.8(1.7)	0.99	43	1.6	17.3	81.1
Anesthesia														
7. Tonsillectomy	104.7	-11.5	-0.16	18.1**	17.0***	4.2*	-7.5	7.9	-11.1*(4.0)	2.7**	44	0.67	37.4	61.9
8. Appendectomy	136.5	10.9	-0.30	26.7***	19.2**	5.6*	-10.3	9.2	-13.7**(4.2)	2.8**	44	0.62	38.8	60.6
9. Hysterectomy	-10.0	52.6**	-1.3*	-15.2	21.1	2.8	-13.7	-0.66	5.7(0.06)	1.2	44	1.4	19.5	79.1
Diagnostic														
10. Chest X-ray	14.4	2.3	0.02	-2.9	1.7	0.01	-0.17	1.4	-1.2(0.59)	0.93	44	2.5	15.0	82.5
11. Electrocardiogram	20.7	0.36	0.01	-1.2	-0.71	1.4**	-0.34	-0.83	-1.7(1.3)	1.5	45	5.4	19.8	74.7
12. Blood urea nitrogen	10.5	0.09	-0.07***	-0.42	0.11	-0.17	0.78	0.55	-0.53(0.58)	2.6**	44	0.15	37.3	62.5
13. Hematocrit	6.0	-0.39	-0.02	-0.05	0.80	0.14	-0.10	0.06	-0.57(1.3)	1.2	43	0.45	22.2	77.4
14. Urinalysis	5.3	0.08	-0.03**	0.34	0.52	-0.01	-0.19	-0.03	-0.06(0.03)	1.3	45	2.0	20.0	78.1
15. Pap smear	12.0	-0.06	-0.09***	1.5	2.4	-0.13	-0.64	1.8	-0.90(0.83)	2.9**	45	0.60	38.3	61.1
Doctors' visits														
16. Consultation	24.3	7.2*	0.05	-2.9	-1.2	2.6	-4.9	11.4**	1.0(0.07)	1.8	44	0.04	29.1	70.8
17. Intermediate hospital visit	9.3	1.4	0.01	-4.9	2.5	1.5	3.0	5.9*	0.56(0.04)	1.3	40	0.06	25.1	74.8

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Each row may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

d/F statistic in parentheses.

* Significant at .90.
** Significant at .95.
*** Significant at .99.

APPENDIX VIII

Table 16

Results of Regression Analyses Using 45 Plans, Selected Explanatory Factors, and the Medical Society Influence Factor

Regression number/ procedure name	Estimated coefficients (note a) Constant term	Income per capita (note c)	Plan had UCR system	Mal-practice insurance rates (note c)	Plan subject to premium tax	Plans highly affiliated with Blue Cross	Medical society influence (note d)	F statistic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b) Medical society influence	Other explanatory variables	Unexplained
Surgery												
1. Appendectomy	238.5	13.6	31.0*	14.6**	-14.4	47.9***	-2.9(0.03)	2.9**	45	0.10	31.1	68.8
2. Cholecystectomy	283.8	43.1**	44.9*	17.0*	1.2	77.8***	-1.6(0.01)	3.2**	45	0.05	33.7	66.3
3. Dilation and curretage	58.6	18.3	26.4*	3.2	-5.8	34.8**	7.0(0.32)	2.3*	45	1.6	25.3	73.1
4. Hysterectomy	224.5	68.8***	74.4**	15.1	-12.2	78.9**	-16.0(0.36)	4.1***	45	0.44	38.8	60.8
5. Complete obstetrical care	94.6	53.2**	47.5*	15.6	8.3	76.3***	5.9(0.06)	3.2**	45	0.00	33.5	66.5
6. Surgical assistant at cholecystectomy	68.8	12.2	17.5	-2.3	0.01	2.4	-9.1(0.78)	0.80	43	1.6	10.2	88.2
Anesthesia												
7. Tonsillectomy	88.0	-8.1	16.4**	3.3	-4.5	8.4	-8.6(2.3)	2.4**	44	0.67	27.6	71.7
8. Appendectomy	112.6	-6.8	18.4**	4.5	-5.8	10.3	-9.5(1.8)	2.0*	44	0.62	23.4	75.9
9. Hysterectomy	18.9	27.7	23.7	7.4	-15.3	5.0	13.7(0.34)	0.95	44	1.4	12.0	86.6
Diagnostics												
10. Chest X-ray	17.0	1.7	1.8	0.17	-0.62	1.4	-1.5(1.1)	0.92	44	2.5	10.5	87.0
11. Electrocardiogram	21.8	0.09	-0.66	1.5**	-0.54	-0.84	-1.8(1.7)	2.1*	45	5.4	19.1	75.4
12. Blood urea nitrogen	12.5	-1.3*	0.37	0.02	0.70	0.77	-0.26(0.12)	1.4	44	0.15	18.4	81.5
13. Hematocrit	6.5	-0.78*	0.88*	0.19	-0.12	0.12	-0.49(1.1)	1.3	43	0.45	17.5	82.0
14. Urinalysis	5.3	-0.26	0.56	0.05	-0.10	0.12	0.16(0.17)	0.58	45	2.0	6.4	91.7
15. Pap smear	11.3	-0.91	2.4**	0.01	-0.29	2.2*	-0.18(0.03)	2.0*	45	0.60	23.7	75.7
Doctors' visits												
16. Consultation	26.6	6.9**	-1.1	2.7*	-5.4	11.2***	0.48(0.02)	2.4**	44	0.04	28.3	71.6
17. Intermediate hospital visit	14.6	-0.33	3.0	1.9*	2.4	6.5**	0.31(0.01)	1.6	40	0.06	22.3	77.7

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Each row may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

d/F statistic in parentheses.

* Significant at .90.
** Significant at .95.
*** Significant at .99.

APPENDIX VIII

APPENDIX VIII

Table 18

Results of Regression Analyses Using Pooled Composite of 1977 Customary Allowances Transformed to Logarithms

Factor	Estimated coefficients (note a)			
Constant	2.1	2.0	2.1	1.8
Board A (note b)	0.06***(7.0)	-	0.07***(12.3)	-
Medical society influence (note b)	-	-0.02(1.0)	-	0.08***(21.0)
Income per capita (note c)	-0.01	0.01	0.01	0.06***
Plan had UCR system	0.12***	0.13***	0.14***	0.11***
Malpractice insurance rates (note c)	0.02***	0.03***	0.03***	0.04***
Plan subject to premium tax	-0.02	-0.02	0.08***	0.09***
Plans closely affiliated with Blue Cross	-	-0.11***	-	0.18***
Procedures (note d)				
1. Appendectomy, surgery	3.6***	3.6***	3.6***	3.6***
2. Cholecystectomy, surgery	4.1***	4.1***	4.0***	4.0***
3. Hysterectomy, surgery	4.1***	4.1***	4.1***	4.1***
4. Dilation and curretage, surgery	2.9***	2.9***	2.8***	2.8***
5. Complete obstetrical care	3.7***	3.7***	3.7***	3.7***
6. Surgical assistant at cholecystectomy	2.5***	2.5***	2.5***	2.5***
7. Tonsillectomy, anesthesia	2.0***	2.0***	2.0***	2.0***
8. Appendectomy, anesthesia	2.4***	2.4***	2.4***	2.4***
9. Hysterectomy, anesthesia	2.8***	2.8***	2.8***	2.8***
10. Chest X-ray	0.95***	0.95***	0.87***	0.87***
11. Electrocardiogram	0.91***	0.91***	0.86***	0.86***
12. Blood, urea nitrogen	-0.20***	-0.20***	-0.27***	-0.27***
13. Hematocrit	-0.84***	-0.84***	-0.85***	-0.85***
14. Urinalysis	-0.69***	-0.69***	-0.70***	-0.70***
15. Hospital visit, intermediate	0.83***	0.83***	0.78***	0.79***
16. Consultation	1.8***	1.8***	1.8***	1.8***
F statistic for equation	1,788***	1,760***	1,808***	1,865***
Percentage of variation explained by board factor	0.03	0.00	0.05	0.01
Percentage of variation explained by other factors (notes a and e)	98.1	98.2	97.3	97.5
Percentage of variation not explained	1.9	1.8	2.7	2.5
Number of cases	750	750	1,062	1,062
using 45 single payment area plans	x	x	-	-
using 64 plans	-	-	x	x

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/F statistic in parentheses.

c/Coefficients were multipled by 1,000.

d/Pap smear was used as the base procedure in these regressions, using pooled procedure data.

e/Columns may not total 100 percent due to rounding.

***Significant at .99.

Table 20

Analyses to Determine if 1977 Customary Allowances Were Associated With Public Representation and Other Factors; 0.90 Confidence Level

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures: Board classification (note a) A	B	C	D	E
Board classification A	1	-	-	-	-
Board classification B	-	6	-	-	-
Board classification C	-	-	0	-	-
Board classification D	-	-	-	5	-
Board classification E	-	-	-	-	2
Plan size over 1 million	8	10	11	11	8
Plan was closely affiliated with Blue Cross plan	-	-	10	14	-
Malpractice insurance rate	3	3	2	14	3
Income per capita	6	6	7	5	6
Percentage of residents plan covered	10	11	11	0	8
Percentage of participating physicians	6	4	-	-	7
Plan had UCR system	4	3	3	8	8
Plan subject to premium tax	1	1	3	6	1

a/See pages 18 and 19.

Table 22

Analyses to Determine if 1977 Customary Allowances Were Associated With Public Representation and Other Factors; 0.90 Confidence Level; and Living Cost Added

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures: Board classification (note a) A	B	C	D	E
Board classification A	1	-	-	-	-
Board classification B	-	1	-	-	-
Board classification C	-	-	0	-	-
Board classification D	-	-	-	1	-
Board classification E	-	-	-	-	2
Plan size over 1 million	9	9	12	12	9
Plan was closely affiliated with Blue Cross plan	-	-	12	13	-
Malpractice insurance rate	15	15	15	15	15
Income per capita	-	-	-	-	-
Percentage of residents plan covered	-	-	-	-	-
Percentage of participating physicians	10	8	-	-	12
Plan had UCR system	4	3	3	4	7
Plan subject to premium tax	0	0	3	4	0
Cost-of-living estimate (note b)	0	0	2	0	0

a/See pages 18 and 19.

b/See page 96.

Table 24

Analyses to Determine if 1977 Customary Allowances and Average Customary Allowances Were Associated With Medical Society Influence on Board Member Selection and Other Factors; and 0.90 Confidence Level

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures (note a)			
	Using maximum allowance		Using average customary allowance	
Medical society influence	1	0	2	1
Plan size over 1 million	11	12	7	6
Plan was closely affiliated with Blue Cross plan	11	11	13	14
Malpractice insurance rate	4	15	3	10
Income per capita	8	-	8	9
Percentage of residents plan covered	10	-	8	-
Percentage of participating physicians	-	-	-	-
Plan had UCR system	2	1	3	3
Plan subject to premium tax	5	4	2	2
Cost-of-living estimate (note b)	-	1	-	-

a/Allowance levels defined on page 80.

b/See page 96.

Table 26

Analyses to Determine if 1977 Deflated Customary Allowances Were Associated With Medical Society Influence on Board Member Selection and Other Factors; All Dollar Amounts Deflated; and 0.90 Confidence Level

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures			
	Dollar amounts deflated using			
	Average selling price of housing, 1976		BLS intermediate family budget, 1977 (note a)	
Medical society influence	0	5	0	2
Plan size over 1 million	11	6	10	9
Plan was closely affiliated with Blue Cross plan	14	14	12	14
Malpractice insurance rate (deflated)	0	4	1	9
Income per capita (deflated)	16	17	6	5
Percentage of residents plan covered	15	-	13	-
Percentage of participating physicians	-	-	-	-
Plan had UCR system	0	0	2	0
Plan subject to premium tax	5	3	4	4

a/See page 96.

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NOTE TO TABLES IN APPENDIX VIII

In the sensitivity analyses, the cost-of-living estimate and the BLS Intermediate Family Budget (modified) are the same data used in different ways. The cost-of-living estimate is used as a separate factor (tables 21 to 24), and the BLS Intermediate Family Budget (modified) is used as a deflator (tables 25 and 26).

The BLS Intermediate Family Budget was modified as follows: Cities in Blue Shield market areas with a corresponding cost-of-living value were taken as representative of all urban areas within the Blue Shield plan jurisdiction. When no city in a Blue Shield plan area had a corresponding cost-of-living value, the nearest BLS city was used. This metropolitan cost-of-living value was multiplied by the percentage of the Blue Shield market area population residing in urban areas. National nonmetropolitan cost-of-living figures were used for the rural population within each Blue Shield plan jurisdiction. These were weighted by the percentage of the plan population living in nonurban areas. This method was developed by Frank A. Sloan in "Physician Fee Inflation: Evidence from the Late 1960's," in R. Rosett, ed., The Role of Health Insurance in the Health Services Sector, New York, 1976. Similar data were used by Professors Eisenstadt and Arnould in their study cited on page 70.

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Table 25

Analyses to Determine if 1977 Deflated Customary Allowances Were Associated With Medical Society Influence on Board Member Selection and Other Factors; All Dollar Amounts Deflated; and 0.95 Confidence Level

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures			
	Dollar amounts deflated using			
	Average selling price of housing, 1976		BLS intermediate family budget, 1977 (note a)	
Medical society influence	0	1	0	0
Plan size over 1 million	7	6	10	7
Plan was closely affiliated with Blue Cross plan	12	14	10	13
Malpractice insurance rate (deflated)	0	2	0	3
Income per capita (deflated)	16	17	5	1
Percentage of residents plan covered	10	-	11	-
Percentage of participating physicians	-	-	-	-
Plan had UCR system	0	0	0	0
Plan subject to premium tax	4	3	3	3

a/See page 96.

Table 23

Analyses to Determine if 1977 Customary Allowances and Average Customary Allowances Were Associated With Medical Society Influence on Board Member Selection and Other Factors; and 0.95 Confidence Level

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures (note a)			
	Using maximum allowance		Using average customary allowance	
Medical society influence	0	0	0	1
Plan size over 1 million	10	10	6	6
Plan was closely affiliated with Blue Cross plan	10	11	10	13
Malpractice insurance rate	2	13	2	8
Income per capita	5	-	6	6
Percentage of residents plan covered	5	-	6	-
Percentage of participating physicians	-	-	-	-
Plan had UCR system	1	0	2	1
Plan subject to premium tax	3	3	2	1
Cost-of-living estimate (note b)	-	1	-	-

a/Allowance levels defined on page 80.

b/See page 96.

Table 21

Analyses to Determine if 1977 Customary Allowances Were Associated With Public Representation and Other Factors; 0.95 Confidence Level; and Living Cost Added

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures: Board classification (note a) A	B	C	D	E
Board classification A	0	-	-	-	-
Board classification B	-	0	-	-	-
Board classification C	-	-	0	-	-
Board classification D	-	-	-	0	-
Board classification E	-	-	-	-	0
Plan size over 1 million	7	8	11	12	7
Plan was closely affiliated with Blue Cross plan	-	-	9	10	-
Malpractice insurance rate	11	10	12	13	11
Income per capita	-	-	-	-	-
Percentage of residents plan covered	-	-	-	-	-
Percentage of participating physicians	6	6	-	-	8
Plan had UCR system	2	1	1	1	1
Plan subject to premium tax	0	0	2	2	0
Cost-of-living estimate (note b)	0	0	1	0	0

a/See pages 18 and 19.

b/See page 96.

Table 19

Analyses to Determine if 1977 Customary Allowances Were Associated With Public Representation and Other Factors; 0.95 Confidence Level

Factor	Number of times when factors were associated with customary allowance levels for 17 procedures: Board classification (note a) A	B	C	D	E
Board classification A	1	-	-	-	-
Board classification B	-	2	-	-	-
Board classification C	-	-	0	-	-
Board classification D	-	-	-	1	-
Board classification E	-	-	-	-	1
Plan size over 1 million	7	7	11	11	7
Plan was closely affiliated with Blue Cross plan	-	-	11	12	-
Malpractice insurance rate	2	2	2	8	2
Income per capita	5	5	5	4	5
Percentage of residents plan covered	8	8	8	0	4
Percentage of participating physicians	4	0	-	-	4
Plan had UCR system	2	2	2	2	3
Plan subject to premium tax	0	0	2	2	1

a/See pages 18 and 19.

Table 17

Results of Regression Analyses Using 64 Plans, Average Customary Allowances, and the Medical Society Influence Factor

Regression number/ procedure name	Constant term	Estimated coefficients (note a): Income per capita (note c)	Percent of residents plan covered	Plan size over 1 million	Plan had UCR system	Mal-practice insurance rates (note c)	Plan subject to premium tax	Plans highly affiliated with Blue Cross	Medical society influence (note d)	F statistic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b): Medical society influence	Other explanatory variables	Unexplained
Surgery														
1. Appendectomy	141.2	47.5**	-0.94	27.5	19.4	7.6	13.8	64.6***	18.8(1.1)	3.9***	64	0.55	35.9	63.6
2. Cholecystectomy	166.0	89.6***	-1.9**	52.0*	35.7	7.8	38.5	101.4***	20.6(0.63)	5.6***	64	0.11	44.6	55.3
3. Dilation and curretage	62.6	17.1	-0.16	31.5**	19.7	2.6	8.0	42.6***	11.8(1.1)	3.8***	64	0.11	35.4	64.5
4. Hysterectomy	140.6	103.1***	-1.5	74.8**	62.5*	5.9	24.0	104.4***	9.8(0.11)	5.6***	64	0.00	44.7	55.3
5. Complete obstetrical care	116.2	65.5***	-0.99	27.1	42.0	0.95	22.9	74.8***	5.8(0.07)	3.7***	64	0.02	35.2	64.8
6. Surgical assistant at cholecystectomy	46.7	17.0*	-0.44	20.0**	13.2	0.62	10.7	9.0	5.2(0.38)	2.4**	61	0.41	26.5	73.1
Anesthesia														
7. Tonsillectomy	78.0	-2.1	-0.36**	18.4***	15.0**	2.6**	1.2	7.3	-9.0*(3.6)	5.8***	62	3.4	43.4	53.2
8. Appendectomy	77.7	7.5	-0.60**	27.1***	17.3**	2.7	4.5	15.6*	-10.1(2.2)	5.9***	62	2.5	44.9	52.7
9. Hysterectomy	-4.3	51.7***	-1.4**	14.0	20.5	9.0	-1.4	13.4	-1.9(0.01)	2.2**	62	0.43	24.1	75.4
Diagnostics														
10. Chest X-ray	11.5	2.5*	0.00	-0.38	1.4	0.54	1.1	2.8*	0.61(0.24)	1.8	62	0.12	20.8	79.1
11. Electrocardiogram	20.3	0.25	0.01	1.1	0.10	0.97***	1.4	0.14	-0.57(0.19)	1.6	62	0.50	18.9	80.6
12. Blood urea nitrogen	8.6	0.07	-0.07***	0.18	0.22	0.17	1.3**	1.5**	0.25(0.20)	4.2***	61	0.04	41.0	58.9
13. Hematocrit	3.7	-0.07	-0.03	0.67	1.0*	0.24*	0.86*	0.97*	-0.20(0.16)	2.8**	60	0.47	29.7	69.8
14. Urinalysis	5.0	-0.14	-0.03*	1.2**	0.72	0.17	0.59	0.85	0.25(0.30)	3.1***	63	0.11	31.3	68.5
15. Pap smear	8.2	0.41	-0.08***	2.0**	1.9*	-0.06	0.82	2.8***	1.4(2.6)	4.5***	63	2.3	37.8	59.8
Doctors' visits														
16. Consultation	24.2	7.9**	-0.02	3.8	-1.6	1.4	-0.91	10.8**	2.7(0.59)	2.3**	62	0.20	26.0	73.8
17. Intermediate hospital visit	14.0	2.1	-0.12	-1.5	2.6	0.68	2.9	4.7*	-0.02(0.00)	1.8*	56	0.00	23.9	76.1

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Rows may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

d/F statistic in parentheses.

*Significant at .90.
**Significant at .95.
***Significant at .99.

APPENDIX VIII

Table 15

Results of Regression Analyses Using 64 Plans, Selected Explanatory Factors, and the Medical Society Influence Factor

Regression number/ procedure name	Estimated coefficients (note a)									Percent of variation in 1977 customary allowances explained by (notes a and b)		
	Constant term	Income per capita (note c)	Plan had UCR system	Malpractice insurance rates (note c)	Plan subject to premium tax	Plans highly affiliated with Blue Cross	Medical society influence (note d)	F statistic for total equation	Number of plans	Medical society influence	Other explanatory variables	Unexplained
Surgery												
1. Appendectomy	58.1	59.2**	7.5	13.4*	31.5	81.4***	40.2(2.3)	3.2***	64	0.91	24.1	75.0
2. Cholecystectomy	-31.7	110.9***	32.6	18.1*	77.1**	154.7***	78.8**(4.4)	5.4***	64	1.3	35.1	63.6
3. Dilation and curretage	-0.85	31.4**	14.7	7.0*	12.3	51.0***	30.7**(5.1)	4.4***	64	3.7	27.8	68.6
4. Hysterectomy	-71.0	131.8***	54.0	21.3**	59.8	148.8***	77.7*(3.8)	5.6***	64	1.5	35.7	62.8
5. Complete obstetrical care	-2.2	80.8***	41.0	7.5	35.7	99.3***	47.4*(3.3)	4.9***	64	1.4	32.6	66.0
6. Surgical assistant at cholecystectomy	5.4	22.6**	10.3	4.5	15.9	18.1	11.3(1.1)	2.4**	61	0.43	21.0	78.6
Anesthesia												
7. Tonsillectomy	66.6	-3.4	13.4*	4.7***	5.5	12.9*	-0.21(0.00)	2.6**	62	0.02	21.8	78.1
8. Appendectomy	62.4	5.0	12.9	6.0**	12.0	23.0**	1.7(0.03)	2.2*	62	0.01	19.2	80.8
9. Hysterectomy	-12.2	35.6*	16.6	6.9	8.4	22.1	19.3(1.0)	1.7	62	1.3	14.4	84.4
Diagnostics												
10. Chest X-ray	8.9	2.9**	1.7	0.63*	1.9	3.6**	1.1(0.76)	3.3***	63	0.02	26.0	74.0
11. Electrocardiogram	17.8	0.91	-0.25	1.1***	2.6*	0.80	0.41(0.08)	2.4**	63	0.07	20.2	79.7
12. Blood urea nitrogen	8.5	-0.74	0.47	0.40**	1.7**	2.0***	0.63(0.87)	3.5***	62	0.20	27.5	72.3
13. Hematocrit	1.0	0.17	0.90	0.38**	1.5**	1.9***	0.78(1.6)	3.7***	61	0.46	28.7	70.8
14. Urinalysis	1.7	0.19	0.79	0.34**	1.4**	2.0***	1.1*(3.5)	3.8***	64	1.8	26.9	71.3
15. Pap smear	5.8	0.11	2.3*	0.33	1.6	3.5***	1.5(2.0)	3.0**	64	1.7	22.3	76.0
Doctors' visits												
16. Consultation	11.8	10.4**	-1.3	2.5*	-0.60	11.0**	8.5*(3.2)	2.7**	62	2.9	19.8	77.2
17. Intermediate hospital visit	12.8	0.55	2.4	1.4**	3.3	5.8**	2.6(1.1)	2.2*	56	1.0	20.3	78.7

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Each row may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

d/F statistic in parentheses.

* Significant at .90.
** Significant at .95.
*** Significant at .99.

APPENDIX VIII

Table 13

Results of Regression Analyses
Using 64 Plans and the
Medical Society Influence Factor

Regression number/ procedure name	Constant term	Estimated coefficients (note a): Income per capita (note c)	Percent of residents plan covered	Plan size over 1 million	Plan had UCR system	Malpractice insurance rates (note c)	Plan subject to premium tax	Plans highly affiliated with Blue Cross	Medical society influence (note d)	F statistic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b): Medical society influence	Other explanatory variables	Unexplained
Surgery														
1. Appendectomy	105.9	65.1**	-1.7*	58.2**	13.2	7.2	26.9	63.3**	23.0(0.78)	3.6***	64	0.91	33.5	65.6
2. Cholecystectomy	46.4	114.7***	-2.3*	92.4**	41.7	9.5	69.8*	128.4***	53.6(2.2)	5.7***	64	1.3	43.9	54.8
3. Dilation and curretage	45.8	21.2	-0.37	49.6***	19.6	5.2	8.7	42.1***	22.1*(3.0)	5.8***	64	3.7	42.0	54.3
4. Hysterectomy	35.2	126.8***	-2.3*	120.9***	65.9	12.4	50.5	118.6***	48.8(1.6)	6.4***	64	1.5	46.8	51.7
5. Complete obstetrical care	52.4	79.8***	-1.3	63.0**	47.2	2.5	30.8	82.9***	31.6(1.5)	5.0***	64	1.4	40.6	58.0
6. Surgical assistant at cholecystectomy	32.8	21.2*	-0.64*	31.4***	15.8	2.2	14.7	11.0	2.3(0.05)	3.6***	61	0.43	35.2	64.4
Anesthesia														
7. Tonsillectomy	88.6	-5.3	-0.41**	26.3***	16.1**	3.0**	2.9	6.5	-6.4(1.3)	5.9***	62	0.02	47.0	53.0
8. Appendectomy	94.7	3.8	-0.73**	39.4***	16.9	3.2	8.1	12.8	-8.2(0.92)	5.4***	62	0.01	45.0	55.0
9. Hysterectomy	4.5	49.1**	-1.5**	26.8	19.5	1.8	5.9	9.5	6.6(0.12)	2.3**	62	1.3	24.6	74.1
Diagnostics														
10. Chest X-ray	9.0	2.9*	-0.00	0.04	1.7	0.63*	1.9	3.6**	1.1(0.69)	2.4**	63	0.02	26.0	74.0
11. Electrocardiogram	18.9	0.73	-0.02	1.2	-0.10	1.1**	2.5*	0.59	0.13(0.01)	1.8*	63	0.07	21.1	78.8
12. Blood urea nitrogen	8.0	0.26	-0.07***	0.47	0.41	0.17	1.7***	1.6**	0.27(0.18)	4.7***	62	0.20	41.1	58.7
13. Hematocrit	1.4	0.39	-0.03	0.65	0.96	0.29*	1.4**	1.7**	0.54(0.74)	3.2***	61	0.46	32.4	67.1
14. Urinalysis	2.6	0.26	-0.03	1.2*	0.91	0.23	1.4**	1.6**	0.78(1.7)	3.7***	64	1.8	33.3	64.8
15. Pap smear	7.7	0.70	-0.10***	2.5**	2.5*	-0.01	1.4	2.6**	0.67(0.42)	4.2***	64	1.7	36.1	62.2
Doctors' visits														
16. Consultation	22.9	8.8*	-0.15	10.9**	0.06	1.9	-1.1	8.8	5.9(1.5)	2.8**	62	2.9	27.0	70.1
17. Intermediate hospital visit	11.9	2.6	-0.16*	-0.16	2.7	0.87	3.3	4.7*	1.7(0.45)	2.1*	56	1.0	25.6	73.4

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Rows may not total 100 percent due to rounding.

c/Coefficients were multiplied by 1,000.

d/F statistic in parentheses.

* Significant at .90.
** Significant at .95.
*** Significant at .99.

APPENDIX VIII

GUIDE TO TABLES

Two sets of tables follow. The first set presents coefficients and other information for the factors we examined in selected regression analyses. The second set presents information in a more summary fashion. Coefficients are not provided; rather, the number of times a factor was significant at the indicated level of confidence is given. Data provided in the second set of tables are based on our 64-plan analyses.

The tables summarize additional analyses with the specifications indicated for each table. Hyphens in the tables show that the indicated relationship was not tested in the instance shown.

The factor called "cost-of-living estimate" used in tables 21, 22, 23, and 24 was developed by Arnould and Eisenstadt (see factor 9, p. 70).

In tables 23 and 24, the term "using maximum allowance" means that analyses were based on the single highest allowance for each procedure, whether the Blue Shield plan had one or more payment areas. In the maximum allowance columns two sets of analyses are presented. These differ in that, in the second set, a cost-of-living estimate replaces the income per capita and percentage of residents covered factors.

In these same tables, the term "using average customary allowances" means that analyses were based on an average allowance computed across payment areas for those 19 plans which had more than one payment area. The average customary allowance columns present two sets of analyses differing in that the second set excludes the percentage of residents covered factor.

In tables 25 and 26, two sets of analyses are presented in each column. The second set differs only in that it excludes the percentage of residents covered factor. Also, in tables 25 and 26 all factors described by the term "deflated" are defined as equaling the factor itself divided by the factors named in the respective column headings. For example, in columns 1 and 2 of table 25 each plan's 1977 allowance, income per capita, and malpractice insurance rate were separately divided by the 1976 average selling price for housing in each plan area.

As shown in the 64-plan analysis line of table 11, medical society influence was not a significant factor in explaining differences in 1977 customary allowances for any of the 17 procedures tested. Other factors in our analyses and the number of times they were significant in explaining differences in 1977 allowances are also presented.

We tested the sensitivity of our results to several changes. We used

--three separate estimates of place-to-place cost-of-living differences,

--a 90-percent confidence level,

--the average customary allowance for plans with more than one payment area, and

--allowances from only 45 single payment area plans.

The results with respect to the medical society influence factor did not change substantially when we made these changes.

OTHER FACTORS' RESULTS VARIED IN SENSITIVITY ANALYSES OF MEDICAL SOCIETY INFLUENCE

Although our primary interest in the analyses presented in table 11 was in the factor indicating medical society influence, we also reviewed the results of other factors.

The importance of two factors, percentage of residents covered and income per capita, substantially increased in the medical society influence analyses when certain factors (including income per capita) were adjusted using different cost-of-living estimates. (See changes 1b and 1c in table 11.)

Also, as noted in footnote 1, page 77, a measure of malpractice insurance rates explained differences in allowances for none of the procedures when adjusted by cost-of-living estimates, yet in one sensitivity analysis it was substantially associated with differences in allowances for 13 procedures when living cost was a separate factor. Therefore, we continue to believe that our results concerning malpractice insurance rates are inconclusive.

Table 10

Results of Sensitivity Analyses on Other Factors Using Board Classification A

Analysis	Number of procedures (out of 17) when factor was statistically significant in explaining differences in customary allowances: Percentage of residents plan covered	Plan size over 1 million	Income per capita	Percentage of participating physicians	Plan had UCR system	Malpractice insurance rate	Plan subject premium tax	Cost-of-living estimate	Board A (note a)
64 plans, 1977 allowances, no cost-of-living factor, and 0.95 confidence level	8	7	5	4	2	2	0	-	1
Change									
1. Cost of living as separate factor	(b)	7	-	6	2	11	0	0	0
2. 0.90 confidence level	10	8	6	6	4	3	1	-	1

a/Definition on page 18.

b/Hyphens show the indicated relationship was not tested.

APPENDIX VIII

SUMMARY OF SENSITIVITY ANALYSES

We made several sensitivity analyses to test how changing certain assumptions or approaches that we had used in our analyses might change our results. This appendix presents the results of those additional analyses. In general, the changes we made did not alter the results of our original analyses, especially as the results related to the public representation factor.

PUBLIC REPRESENTATION MEASURED IN DIFFERENT WAYS WAS NOT FOUND IMPORTANT IN EXPLAINING DIFFERENCES IN ALLOWANCES

Our 64- and 45-plan analyses classified as "public" those boards that had a majority of public members who had been selected without medical society involvement. However, as stated in chapter 2, we recognized that this was not the only way to define a public board and developed and analyzed four other classifications. (See classifications B through E, pp. 18 and 19.)

After developing these classifications, we analyzed our 64-plan data using each classification separately. As the basic analysis line in table 9 (p. 75) shows, none of the other classifications of what constituted a public board changed our conclusion: public representation was not important in explaining differences in allowance levels.

We also analyzed our 64-plan data for each of the definitions of public majority boards using

--estimates of cost-of-living differences for each plan and

--a 90-percent confidence level.

The results of these analyses were close to the results of the 64-plan analysis except when the confidence level was lowered for board classifications B and D. (See table 9, change 2.) However, using these two classifications produced conflicting results. Using classification B, boards defined as public were associated with higher allowances for 6 of the 17 procedures. Using classification D, boards with higher percentages of public members were associated with lower allowances for 5 of the 17 procedures.

The series is published for 44 urban areas. The BLS series addresses two hypothetical families and three levels of living. One family is a four-person family with a fully employed father, age 38, a nonworking wife, and two children, ages 13 and 8; the other is a retired couple. The three levels of living are high, intermediate, and low. The total cost of the budgets is based on a market basket of goods and services theoretically consumed by the hypothetical families. The content of the baskets is based on needs standards, observed consumption patterns, and judgments by the BLS staff.

REASONS FOR EXCLUDING AVAILABLE LIVING COST MEASURES FROM OUR ANALYSES

Although differences in geographic living costs can, and probably do, affect customary allowance levels and other economic factors, we excluded them from our analyses because we believed that the only available living cost measures, the BLS family budget series, were not reliable enough for our uses. Our unwillingness to use the BLS budgets is supported by HHS in the "Poverty" report noted earlier. After a detailed examination of the conceptual problems encountered in estimating geographic differences in living costs and of the methodology BLS uses to compute its budget series, the report concluded that BLS budgets "have certain inherent limitations which preclude their use as accurate measures of cost-of-living differences." BLS has admitted that there are conceptual and statistical limitations in the family budget indexes as measures of cost-of-living differentials. In fact, in 1971 a BLS commissioner attempted to discontinue the series for these technical reasons.

Furthermore, however strong or weak its conceptual basis, the BLS series covers only 44 cities. This means that some Blue Shield plan areas are not represented. Even for plan areas with cities included in the series, the cost of living in the entire plan area is probably not represented by the average cost of living of the particular city or cities covered. As stated in the "Poverty" report, the family budget series provides no way to measure the differences in costs of living between a city and a rural area; the cost of living in a city included in the series cannot be construed as being typical of the cost of living in rural areas in the plan area. The cities in the family budget series are grouped by regions, but the cost of living in the cities cannot be construed as being typical of living costs in the region. Substantial differences occur among the indexes for cities within each region.

APPENDIX VI

Table 8

Information on Factors Used in Analyses

Factor	Source	Comments
Cost containment		
Customary allowances for 17 health care procedures, 1977	Blue Shield plans	
Board composition (note a)		
1. Board classification A	Our questionnaire, items 4 and 7	
2. Board classification B	Our questionnaire, items 4, 18, and 19	
3. Board classification C	Our questionnaire, items 4, 18, and 19; FTC analysis of 1977 Application for Renewal of Membership, National Association of Blue Shield Plans, item 11	
4. Board classification D	Our questionnaire, item 4	-
5. Board classification E	Our questionnaire, items 4 and 19	-
Medical society influence (note b)	Our questionnaire, items 16 and 18 FTC files on plan bylaws and corroborating calls to plans	-
Other		
1. Income per capita in plan area, 1973	American Medical Association, 1976. "Physician Distribution and Medical Licensure in the U.S., 1975"	Average income was computed for counties (or entire States) served by plan
2. Percentage of residents plan covered, 1977	Our questionnaire, item 3	-
3. Plan size over 1 million, 1977	National Association of Blue Shield Plans, Chicago, Illinois	-
4. Plan had UCR system, 1977	Our questionnaire, item 23	
5. Malpractice insurance rates, 1976	Health Care Financing Administration, HHS	Rates of insurance company with highest percentage of malpractice insurance business for physicians who do surgery was applied to all plans in a State
6. Plan subject to premium tax, 1978	National Association of Life Underwriters, Washington, D.C.	-
7. Percentage participating physicians in plan area, 1977	Our questionnaire, item 22	-
8. Plan was closely affiliated with Blue Cross, 1977	National Association of Blue Shield Plans	Used in sensitivity analyses
9. Cost-of-living estimate in plan area, 1976	Estimate provided by Professors David Eisenstadt and Richard Arnould (estimate developed for use in their study, "Blue Shield Fee Setting in the Physicians' Services Market: A Theoretical and Empirical Analysis," April 1978)	-
10. Intermediate urban family budget, 1977	BLS, "News," Autumn 1977	BLS figure for plan headquarters city was used. Otherwise, average of figure from BLS cities in Northeast, Northcentral, South, and West geographic areas was applied to plans in those areas. (used in sensitivity analyses as deflators)
11. Average sales price of previously occupied houses, 1976	Bureau of Census, "1977 Census of Governments," November 1978	Amount cited per State was applied to plan(s) in that State. (used in sensitivity analyses as deflators)

a/Defined on pp. 18 and 19.

b/Defined on p. 19.

TABLE 6

Correlations Among 15 Factors in Final Analyses and 5 Excluded Factors

Factors in analyses	Factors excluded from analyses: Plans located in: North	South	West	Frequency of allowance updates	Plans having more than one payment area
1. Board A (note a)	-0.03	0.10	-0.09	-0.02	0.14
2. Board B	-0.05	0.05	-0.10	-0.13	0.09
3. Board C	-0.14	0.04	-0.03	0.09	-0.06
4. Board D	-0.32	-0.04	-0.20	0.18	0.04
5. Board E	0.30	-0.02	-0.18	0.10	0.02
6. Medical society influence	0.08	0.02	-0.11	0.08	0.22
1. Income per capita	0.24	b/-0.46	0.12	0.27	0.10
2. Percent of population covered	b/0.51	-0.18	-0.29	0.29	-0.14
3. Plan size over 1 million	0.13	0.11	-0.33	-0.02	b/0.51
4. Plan had UCR system	-0.16	-0.08	-0.01	0.02	0.14
5. Malpractice insurance rates	-0.001	-0.23	b/0.47	0.20	0.15
6. Plan subject to premium tax	0.15	-0.11	-0.02	-0.11	0.08
7. Percent of participating physicians	0.24	-0.25	0.21	b/0.49	-0.37
8. Plan closely affiliated with Blue Cross	-0.15	0.33	-0.20	-0.34	0.02
9. Cost-of-living estimate	b/0.57	-0.35	-0.05	0.25	0.14

a/See pages 18 and 19 for classifications of boards.

b/Correlation coefficients exceeded our criteria for indication of high intercorrelation (0.4 or higher, - 0.4 or lower).

Initially, we had planned to use average payment information from the Blue Shield Federal Employee Program as an indicator of cost containment. However, our decision to substitute plan allowance information for Federal Employee Program average payment data made these two factors irrelevant.

Seventh, we used correlation analysis to determine if any of the other 20 factors were redundant. After reviewing the correlation coefficients among these factors, we eliminated five factors from further analysis. For example, we found that Blue Shield plans located in the South were associated with lower income per capita; that is, those two factors were highly correlated. 1/ Because using highly correlated factors in regression analysis produces statistically unreliable estimates, we included only one factor from sets of factors which were highly correlated. (See table 6 on p. 68.)

We tested the sensitivity of our original results to including these five factors. We found our public representation and medical society influence results were not sensitive to including these five factors; that is, excluding them from our analyses had not biased our results.

The following list presents the 29 factors eliminated from our analyses and our rationale for excluding them. Table 7 (p. 69) shows correlations among the 15 factors included in our analyses, and table 8 (p. 70) gives definitions and sources for various factors used in our analyses.

1/We defined highly correlated to mean having a correlation coefficient of +0.4 or higher or of -0.4 or lower. A positive correlation coefficient means that the factors in question tend to increase (or decrease) together. A negative coefficient means that the factors have an inverse relationship. As one increases, the other decreases. Values of the coefficients may range from -1.0 to +1.0.

Table 5

Results of Regression Analyses
Using 45 Plans and Board Classification A

Regression number/ procedure name	Constant term	Estimated coefficients (note a): Income per capita (note c)	Percent of residents plan covered	Plan size over 1 million	Plan had UCR system	Malpractice insurance rates (note c)	Plan subject to premium tax	Percent of participating physicians	Board classification A (note d)	F statistic for total equation	Number of plans	Percent of variation in 1977 customary allowances explained by (notes a and b): Board classification A	Other explanatory variables	Unexplained
Surgery														
1. Appendectomy	283.9	22.7	-0.32	-16.0	31.4	14.0**	-26.2	-0.72**	20.3(1.0)	2.8**	45	6.7	31.8	61.5
2. Cholecystectomy	356.4	68.0***	-1.3*	-10.8	48.6*	15.3*	-19.2	-1.3***	19.4(0.51)	4.6***	45	6.2	44.4	49.4
3. Dilation and curretage	135.6	10.5	0.53	6.9	45.0***	6.3	-19.1	-0.89***	-23.0(2.2)	3.2***	45	0.74	40.7	58.6
4. Hysterectomy	298.3	84.6***	-0.74	-10.5	73.2**	15.4	-30.7	-1.2**	35.1(0.99)	3.9***	45	8.7	37.7	53.5
5. Complete obstetrical care	208.9	46.2*	-1.1	30.8	40.5	13.0	-8.4	-0.28	53.5(2.5)	2.1*	45	9.7	22.3	68.0
6. Surgical assistant at cholecystectomy	65.6	16.6	-0.29	10.2	19.9	-2.0	2.2	-0.12	-10.8(0.61)	0.84	43	0.12	16.4	83.5
Anesthesia														
7. Tonsillectomy	104.7	-10.2*	0.27	12.7	19.4***	5.2**	-6.1	-0.25*	-3.2(0.17)	2.5**	44	2.9	34.1	63.8
8. Appendectomy	135.7	-9.3	-0.07	20.3**	22.2**	6.7**	-8.1	-0.29*	-4.7(0.24)	2.5**	44	1.2	35.5	63.3
9. Hysterectomy	-2.1	54.0**	-1.2	-17.5	27.9	4.2	-16.5	-0.27	-11.5(0.12)	1.2	44	0.19	21.2	78.7
Diagnostics														
10. Chest X-ray	14.4	2.1	0.01	-3.0	1.3	-0.20	0.54	0.02	0.88(0.20)	0.78	44	0.69	14.4	84.9
11. Electrocardiogram	17.7	0.57	-0.00	-1.3	-1.9	1.5**	0.12	0.02	2.4(1.6)	1.6	45	0.53	25.3	74.2
12. Blood urea nitrogen	10.6	0.21	-0.07***	-0.69	-0.17	-0.11	0.66	-0.01	0.93(1.1)	2.9**	44	1.8	37.9	60.2
13. Hematocrit	5.6	-0.26	-0.01	-0.39	1.0*	0.22	-0.01	-0.02*	-0.65(1.2)	1.6	43	0.24	26.6	73.2
14. Urinalysis	5.2	0.09	-0.03**	-0.33	0.43	-0.00	-0.20	0.00	0.23(0.22)	1.3	45	0.21	22.2	77.7
15. Pap smear	13.2	-0.13	-0.08**	1.1	2.4*	-0.18	-0.51	-0.02	0.38(0.08)	2.4**	45	1.2	33.3	65.5
Doctors' visits														
16. Consultation	39.0	5.5	0.05	-3.1	-5.0	2.3	-7.4**	0.00	15.7*** (12.0)	2.8**	44	16.3	22.6	61.1
17. Intermediate hospital visit	18.9	0.72	-0.03	-4.4	2.0	1.5	1.1	-0.05	5.5(2.4)	1.4	40	11.8	14.8	73.5

a/Numbers less than 1 were rounded to the hundredth place; numbers greater than 1 were rounded to the tenth place.

b/Rows may not total 100 percent due to rounding.

c/Coefficients were multipled by 1,000.

d/F statistic in parentheses

*Significant at .90.
**Significant at .95.
***Significant at .99.

APPENDIX V

The results of our 64-plan regression analysis are given in table 4 on page 63. Not only was the public representation factor statistically significant in explaining allowance differences in only one of the procedures, but it also generally explained a small amount of the variation in customary allowances relative to the amount explained by the other factors. Furthermore, for 15 of the 17 procedures, the group of factors as a whole was significant at the 95-percent level of confidence, or greater, in explaining the difference in customary allowances.

The results of our 45-plan regression analysis are given in table 5, page 64. These results are similar to those in the 64-plan analysis in that the coefficient for the board variable was significant in explaining allowance differences for one procedure. For 9 of the 17 procedures, the group of factors as a whole was significant at the 95-percent level of confidence, or greater, in explaining the differences in customary allowances.

Thus, we could usually identify a set of factors that was statistically significant in explaining differences in customary allowances, but the results of the 64- and 45-plan analyses taken together support that public representation was not of that set.

STATISTICAL SIGNIFICANCE

We determined whether a factor was "statistically significant" by testing to see if the estimated coefficient of the factor was statistically different from zero. The method that we used took into account the range of the known values of the factor and the size of the sample as well as the estimated value of the coefficient in computing an "F statistic." We then used statistical tables to determine the probability that this computed F statistic, and therefore the value of the coefficient, was different from zero. If this probability were at least 95 percent or more (at least 90 percent in some of the sensitivity analyses), we said that the estimated value of the coefficient was statistically significant.

MULTIPLE REGRESSION ANALYSIS AND RESULTS OF 64- AND 45-PLAN ANALYSES

The methodology we used in this study involved searching for the factors, including control of boards of directors, that were statistically significant in explaining differences in the customary allowances for each of 17 different health care procedures. The statistical technique we used to determine which factors showed significant relationships is called multiple regression analysis. This appendix explains multiple regression analysis and illustrates how we used it.

DEFINITION

Multiple regression analysis is a statistical technique that measures the relationship between a factor of interest and two or more other factors that may affect it. Regression analysis shows association or relationship; it does not indicate causality. Although regression analysis does not enable an analyst to conclude which other factors cause a change in the factor of interest, it can provide statistics that the analyst can use to

--test which, if any, of the factors, individually or as a group, are statistically significant in explaining differences in the factor of interest (in this study, the plans' customary allowances or other maximum allowable amounts);

--measure how much the differences in the factor of interest are explained by changes in the other factors and whether they are statistically significant; and

--predict values for the factor of interest that will occur if one or more of the other factors change.

HOW WE USED MULTIPLE REGRESSION ANALYSIS

We used multiple regression analysis in the following way:

1. We collected information on customary allowances, public member and provider representation on Blue Shield boards, and other available information on factors that we thought could affect customary allowance levels.

The following table summarizes information on board composition based on our questionnaire. Board categories A through E and medical society influence are classifications used in the analyses. An "X" signifies a plan met the indicated criteria. Under the columns "public required" and "providers required" the percentages shown are those required by State laws or regulations and/or plan bylaws. Some laws or bylaws required boards to have a certain number of members representing various groups. We transformed these numbers to percentages by dividing them by the boards' total authorized memberships in June 1977.

APPENDIX IV

19. Is the current chairman a provider/hospital representative or a public representative? (Check one)

1-/40/ Provider/hospital representative

2-/26/ Public representative

20. Do the by-laws (or state or local laws or regulations) require that the chairman be either a provider/hospital representative or a public representative? (Check one)

1-/6/ Yes

2-/60/ No

21. Currently, when the Board is conducting business and there is a tie vote, is anyone other than the chairman authorized to break the tie? (Check one)

1-/62/ No

2-/3/ Yes (Please specify) _____

_____

(1 plan did not answer this question)

III FEDERAL EMPLOYEES HEALTH BENEFITS PROGRAM

The questions in this section refer only to the high option allowance of the Service Benefit Plan of the Federal Employees Health Benefits Program.

22. About what per cent of all physicians in your service area are participating physicians?

_____%

(Mean is 66.0)

(Range is 0-100)

23. How is the high option "paid-in-full" amount set by your plan? (Check one)

1-/54/ Usual, customary and reasonable (UCR) system is used

2-/4/ A fee schedule is used

3-/5/ Other (Please specify) _____

_____

_____

4-/3/ Provision for payment in full is not made

24. Does your plan pay different rates to satisfy the paid-in-full concept of the Service Benefit plan in different geographical areas of your service area? (Check one)

1-/20/ Yes

2-/46/ No

APPENDIX IV

12. Do the by-laws (or any other internal administrative regulations or procedures) of your plan require that your Board be composed of a certain number of individuals? (Check one and fill in where appropriate)

1-[2] No

2-[36] Yes, the Board must have _____ members

3-[21] Yes, the Board must have at least _____ members

(7 plans provided "other" answers.)

13. Do the by-laws or any other internal administrative regulations or procedures of your plan require that a certain per cent of the Board members come from given occupational categories? (Check those which apply and fill in where appropriate)

1-[16] No

2-[39] Yes, at least _____% must be physicians or osteopaths

3-[5] Yes, at least _____% must be licensed providers other than physicians or osteopaths

4-[16] Yes, at least _____% must be hospital representatives

5-[37] Yes, at least _____% must be public representatives

6-[3] Yes, other (Please specify)

_____

_____

_____

(Total is greater than 66 because some plans provided more than one answer.)

14. Are there any other by-laws or any other internal administrative regulations or procedures which influence the composition of your Board? (Check one)

1-[44] No

2-[ ] Yes (Please specify or attach excerpts)

APPENDIX IV

7. For each public representative member (indicated on line (6) in Question 4):

   (1) list the member's place of employment (name of firm),

   (2) list the member's occupation,

   (3) indicate whether or not the member has any medically related training,

   (4) indicate whether or not the member is in medically related employment.

(1) Place of employment	(2) Occupation	(3) Medically related training? (Check one)		(4) Medically related employment? (Check one)	
		Yes	No	Yes	No
(1) (Information varies					
(2) by plan.)					
(3)					
(4)	(See p. 7 for examples of different				
(5)	occupations held by public members.)				
(6)					
(7)					
(8)					
(9)					
(10)					
(11)					
(12)					
(13)					
(14)					
(15)					
(16)					
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APPENDIX IV

OUR QUESTIONNAIRE SUBMITTED TO BLUE SHIELD PLANS WITH SUMMARY INFORMATION

We received a completed questionnaire of the type in this appendix from 66 Blue Shield plans. We used the responses to derive information on the composition of boards of directors and the plans' management practices. This appendix summarizes the responses. We administered the questionnaire in July 1977.

Which is the more appropriate representation of BSA's findings: the first seventeen table entries or the last, pooled entry? The formal answer to that question is obtained through a standard test in the econometrics literature, the F test for a common coefficient across potentially different samples. We performed this test of the BSA model applied to the GAO data and found that, while some explanatory variables in the model appear to have effects on allowances which vary from procedure to procedure, the effect of board composition appears, by statistical criteria, to be roughly the same for each of these procedures. The practical significance of this test is that it supports the assumption that there is a single, uniform effect of board composition over all procedures, and that, therefore, it is appropriate to combine the procedures and obtain a unique estimate of this variable's effect.

What is the appropriate representation of GAO's findings? GAO discusses a pooled estimate of its model that was performed during the course of the research; GAO has informed us that it, like BSA's estimate, revealed a positive and significant effect of subscriber board influence. GAO correctly notes, however, the need for caution to avoid imposing the technique on models for which pooling would be inappropriate. It seems readily apparent from the first column of Table 1 that pooling might be a highly dubious proposition if applied to the GAO model in exactly its current form. The magnitudes of the estimates differ so markedly that the proper test would probably reveal pooling to be improper. (GAO may have been alerted to this risk by exposure to the FTC study. Inspection of the magnitudes displayed in the FTC's Table B-13A suggests that the FTC may have unwittingly pooled procedures in a situation where pooling was invalid. Without performing the appropriate F tests [which the FTC informs us it had not] it is, of course, not possible to judge the wisdom of the decision with any precision.)

The second column of Table 1 suggests, however, that a slightly modified version of the GAO model might be properly susceptible to a pooled or combined estimate. When "differences in Plans' customary allowances" are expressed as percentage or proportionate changes from the average allowance for each procedure, it can be noted that the differences attributable to board composition are similar from procedure to procedure. Given that BSA's model's estimates proved to be similar enough across procedures to warrant pooling, and given a comparable similarity in GAO's results after a "proportionate effect" modification, it is reasonable to infer that, had GAO estimated such a model, their results would have compelled a conclusion by GAO similar to that reached by BSA: not only is increased subscriber representation not associated with lower allowances, it additionally appears to be distinctly related to higher allowances. On this basis it appears that, despite GAO's interpretation of their study's results, the results themselves are consistent with and tend to support BSA's findings. We believe that the only difference, therefore, is in the precision of the estimates, not in the qualitative direction of the findings.

APPENDIX III

III. A COMPARATIVE ANALYSIS OF THE GAO AND BSA FINDINGS

To provide a sharp comparison of the two sets of results, we redid the BSA study, estimating for each individual procedure the effects of subscriber board representation on the procedure's allowance level. We then recalculated the GAO estimates by dividing each procedure's board composition effect by the mean value of that procedure's maximum customary allowance; this transforms GAO's "absolute dollar effect" estimates into "proportionate effect" estimates. Table 1 reports the results. GAO estimates, for illustration, that subscriber influence on the board is associated with an increase of $46.7, or 12.0%, in appendectomy allowances while BSA's model estimates for this procedure that a shift from no subscriber representation to complete subscriber control would be associated with an increase in the allowance of about 17.2%. These estimates are not inconsistent, as GAO's explanatory variable is dichotomous--a Plan is either "subscriber controlled" or it is not -- while in BSA's model, the measure is continuous -- it is the fraction of the board occupied by subscriber or "public" representatives.

In effect, Table 1 shows what BSA would have found had it for some reason split up its analysis along the lines of GAO's study. Though, of course, none of the BSA estimates is identical to its GAO counterpart -- since the underlying explanatory models vary in numerous respects -- the general run of the results is quite similar: the estimates are, considered in isolation from one another, generally positive in sign but not always statistically significant. The last table entry is the result obtained from the pooled BSA estimate; it too is positive, and is highly statistically significant.

TABLE 1

COMPARISON OF ESTIMATED EFFECTS OF SUBSCRIBER INFLUENCE ON BLUE SHIELD BOARDS ON MAXIMUM CUSTOMARY ALLOWANCE OF SEVENTEEN MEDICAL PROCEDURES

PROCEDURE	GAO ESTIMATES (DOLLAR EFFECT)	GAO ESTIMATES (PROPORTIONATE EFFECT)	BSA ESTIMATES (PROPORTIONATE EFFECT)
Appendectomy	46.7	.120	.172 (1.362)
Cholecystectomy	62.1	.104	.244 (1.941)
Dilation and Curettage	6.0	.032	.320 (1.811)
Hysterectomy	77.7	.119	278 (2.153)

APPENDIX III

COMMENT BY THE BLUE CROSS AND BLUE SHIELD ASSOCIATIONS ON "COMPOSITION OF BLUE SHIELD PLAN BOARDS NOT IMPORTANT IN EXPLAINING DIFFERENCES IN PLANS' CUSTOMARY ALLOWANCES"

William J. Lynk

I. INTRODUCTION AND SUMMARY

The specific purpose of this comment is to compare the findings of the General Accounting Office (GAO) study of Blue Shield allowance levels with the findings of a similar study conducted by the Blue Shield Association (BSA), which have been made available to the Federal Trade Commission (FTC) for use in its investigation of Blue Shield. The GAO and BSA studies diverge in the extent of the conclusions they draw from the empirical evidence. GAO emphasizes that the composition of Blue Shield Plan boards is "not important" in determining the level of Plans' allowances, and therefore abstains from comment on the nature of the effects it finds. BSA also finds that there is no evidence that physician influence on Blue Shield Plan boards is an element contributing to higher allowances. Moreover, BSA's study finds physician board involvement to in fact be associated with lower allowances, though the estimated effects are sufficiently modest that we would not disagree with GAO's characterization of the effects as "not important."

As we demonstrate below, both studies, despite their differences in conclusive emphasis, in fact discover quite similar empirical relationships between board composition and allowance levels and thus are mutually consistent. We emphasize that the focus of this comment is directed solely to a comparison of the results which both GAO and BSA independently obtained, each with its own theoretical model of the determinants of allowances and each with its own choice of statistical methodology. We therefore have necessarily and deliberately chosen to refrain from detailed comment on several other aspects of this issue. In particular, we do not discuss the details of the model which GAO employed to obtain its estimates. There are numerous aspects of GAO's model with which we agree, and there are aspects with which we are inclined to take exception. In light of our more extensive comments submitted to the FTC on the development of an appropriate theoretical model, we will, for purposes of the present comment, simply take GAO's model as a given and discuss its resultant findings. For similar reasons, we will not comment in detail on a related study by the Bureau of Economics of the FTC. And finally, we will not list the results obtained in the BSA study using alternative data sources, results which are quite similar to those discussed below and which also have been reported to the FTC.

APPENDIX II

Comments of the Department of Health, Education and Welfare on the General Accounting Office Draft Report Entitled, "Composition of Blue Shield Plan Boards Not Important in Explaining Differences in Plans' Customary Allowances"

This GAO draft report presents the results of a regression analysis designed to test the hypothesis that Blue Shield plans with a board majority of health care professionals do not have higher payment levels than plans having a board majority of other individuals. This hypothesis was not rejected. Results of this study were briefly compared to those of a Federal Trade Commission (FTC) study which reached the opposite conclusion.

Although we see no problems with GAO's technical application of the specified regression model, we have some concern about the assumptions used to generate the model and the operationalization/ measurement theories used to specify the structural variables.

1. The FTC used a composite of procedures as the financial basis for the independent variable, and thus was able to use a single equation model while GAO used multiple equations for multiple procedures. If one assumes that the same factors are operative in setting maximum allowable charges across procedures, then the FTC approach is more valid. We believe that the "commodity bundle" approach used by the FTC is preferable and that the multiple equation approach is less useful. If GAO had used the former approach, results might have confirmed the FTC results.

2. GAO measured medical influence as either being present (if a board majority were health care professionals) or absent. This is a poor operationalization of influence. A majority is not necessary to influence policy. For accounting purposes, for example, the American Institute of Certified Public Accountants defines "influence" as having over 20 percent ownership. In our judgment, a much more reliable and valid measure of medical influence would have been the proportion of board members who are health care professionals. In addition, such a measure would have had more desirable statistical properties of sufficiency, and completeness.

In short, we feel the results of the study would have been more useful from a policy perspective if more appropriate assumptions were used in deriving the model, and different measurement decisions had been made in operationalizing the key structural variables.

APPENDIX I

whatever discussion or assistance you consider appropriate. We appreciate the opportunity to present these comments.

Sincerely,

William S. Comanor, Director
Bureau of Economics

Alfred F. Dougherty, Jr.,
Director
Bureau of Competition

Attachments

FEDERAL TRADE COMMISSION
WASHINGTON, D. C. 20580

BUREAU OF ECONOMICS

April 11, 1980

Mr. Gregory J. Ahart
Director
Human Resources Division
United States General Accounting
Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Ahart:

As indicated in Chairman Pertschuk's letter of March 7, 1980, the Bureaus of Competition and Economics at the Federal Trade Commission have prepared comments on the draft report written by your staff entitled, "Composition of Blue Shield Boards Not Important in Explaining Differences in Plans' Customary Allowances." We are pleased to forward these comments to you. Please note that the views expressed in this letter and in the attached comments have not been considered by the Commission and do not necessarily represent the views of the Commission or of any individual Commissioner.

Before commenting on the staff report, we want to express our appreciation for the assistance provided by your staff. Our Bureau of Economics in particular was assisted substantially by consultation with your staff, and we hope that the collegial relationships that have developed have been mutually beneficial. These relationships have continued and have evidently led to general agreement on the relevant points at issue.

We should also note the setting from which we view the draft report. Our interest concerns the overall effects of medical involvement in the control of Blue Shield plans as well as the best possible policy towards this involvement. This draft report provides potentially valuable information on this subject. Yet, as the appended comments indicate, there appear to be certain difficulties, many of them technical in nature, which raise some questions regarding the primary findings of the draft report.

To aid your consideration of the draft report, we want to sketch three central areas of concern. The first applies to the title: "Composition of Blue Shield Plan Boards Not Important in Explaining Differences in Plans' Customary Allowances," which appears excessively broad. This title implies, for example, that the draft report finds that

GAO note: We have not included the appended FTC staff comments in our report; we have, however, incorporated the comments in the report where appropriate.

Although we have reservations about the pooling procedure, we have pooled certain of our data in a manner designed to address (1) the suggestions that we pool our data and (2) certain other suggestions of the FTC staff. Because of our reservations about the pooling procedure, we have not drawn conclusions about public representation or medical society influence based solely on our analyses using the pooled data approach. Our pooling was done as follows.

We used allowances from the 45 single payment area plans. This approach removed the question of which allowance or allowances to use if a plan had more than one payment area. Our test had shown that our dollar amount allowances should not be pooled. Therefore, we transformed the dollar amounts to logarithms which could be pooled. Using logarithms also allowed us to measure proportionate changes or differences in allowances. We excluded the three variables alleged to be endogenous. We made our analysis using 1977 allowance data and (1) our basic public representation factor and (2) our medical society influence factor. The results of this pooled data analysis and our interpretations follow. 1/

Boards classified as public were statistically associated with higher pooled composite allowances in 1977. This result may be compared with those of our nonpooled 64- and 45-plan analyses (see ch. 3), where boards classified as public were significantly associated with higher allowances for one procedure for each analysis in 1977. Using both the pooled and nonpooled approaches in our analyses, we believe that boards with public majorities selected without medical society influence cannot be definitively called important in explaining differences in allowances.

Boards classified as subject to medical society influence were not significantly associated with allowance levels for a pooled composite of all procedures in 1977. These results may be compared with those of our nonpooled 64- and 45-plan analyses of medical society influence. These analyses showed that medical society influenced boards were associated with higher allowances for 0 and 1 procedures, respectively.

1/See page 87 for technical results of our analyses using the pooled data approach.

--One factor was part of two of our board composition definitions.

Appendix VI discusses these matters in more detail.

Five factors were excluded from our original analyses because of the potential multicollinearity problem alone. Even though we disagree with FTC's assertion that multicollinear factors should have been included, we made additional analyses to see what our results would have been if these factors had been included. We found our 64-plan analysis results and medical society influence results were essentially the same with or without these five factors.

Because the inclusion of the five variables could have also changed results with respect to the other factors, we have added a table to appendix VI showing the simple correlation coefficients among these 5 factors and the 15 factors we used. Our results for any factor which had a high correlation with any of the five excluded factors may represent the results of some combination of the two factors.

Endogeneity: Our study results showed some sensitivity to removing the three variables that FTC staff said were endogenous--percentage of area residents that plans insured, percentage of participating physicians, and plan size. As the FTC staff noted, we had already tested for distortion which might have resulted from including two factors which FTC staff thought could be endogenous--percentage of area residents that plans insured and percentage of participating physicians. Additional tests showed that excluding simultaneously all these factors did not change our 64-plan results concerning public representation on boards. The number of procedures with which medical society influence was associated increased when all the alleged endogenous variables were excluded simultaneously. At the 0.95 confidence level, medical society influence was significant in explaining higher 1977 allowances for two procedures; at the 0.90 confidence level, medical society influence was significantly associated with six procedures. Including plan

METHODOLOGY

FTC staff had three concerns with our methodology: (1) our use of the highest allowances for each plan, (2) our approach to selecting explanatory factors, and (3) our not pooling data. HHS and the Blue Shield Association expressed concern about our not pooling data.

Using the highest allowance

FTC staff said our using the highest allowance when plans had more than one payment area or using the higher of general practitioner or specialist average allowances in plans having more than one payment area did not measure fully plans' cost-containment efforts. Also, the FTC staff suggested that we use all available allowance information.

We agree that selecting an allowance to use as a cost-containment indicator when a plan has more than one allowance for a procedure poses problems. To remove the possible bias which could be associated with using highest allowances and higher average allowances in plans with more than one payment area and also to avoid the problem of weighting multipayment area plans, we made further analyses using the 45 plans which had only one payment area. The results of these analyses are discussed in chapter 3.

We did not use all available allowance information as the FTC staff has suggested because our study was intended to examine the relationship between customary allowance levels and public member representation on the plans' boards. Boards operate plan-wide; therefore, a single plan-wide measure is appropriate. Using all available payment data would weight plans with multiple payment areas more than the other plans for no reason which was relevant to our analysis. For example, using all available allowances would entail the assumption that the Blue Shield plan in Mississippi should be counted once while the Alabama plan should be counted six times. As a further example, using each of the two Wisconsin Blue Shield plan's 72 payment areas would result in the Wisconsin plans accounting for 144 payment areas--about 60 percent of the Blue Shield plan payment areas in the United States. We believe that this approach would have given undue influence to plans with more than one payment area.

CHAPTER 4

COMMENTS ON OUR DRAFT REPORT AND OUR EVALUATION

FTC staff, HHS, and the Blue Shield Association reviewed and commented on our draft report. FTC staff and HHS were generally critical of our draft report, while the Blue Shield Association was not.

In their April 11, 1980, letter, the Directors of FTC's Bureaus of Economics and Competition (see app. I) presented three general areas of concern: (1) the draft report's being overly broad in its generalizations about "provider" and "medical" influence on boards; (2) our classification of some boards as not subject to medical society influence; and (3) our study methodology, namely, our use of the highest customary allowance as a measure of cost containment, our method of selecting the explanatory factors we used in the regression analyses, and our not pooling information into a single equation to analyze information on all 17 health care procedures simultaneously. HHS comments also suggested that we pool our data (see app. II) 1/ as did Blue Shield. (See app. III.)

"PROVIDER" AND "MEDICAL" CONTROL

FTC staff commented that our draft report title and portions of the text might be interpreted to mean that medical control of plan boards would not affect fee limits. They said, "It is not clear that findings regarding 'health providers' in general apply to a more sharply defined group of providers, such as a medical society * * *." Furthermore, the staff was concerned that, where our draft report discussed

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1/HHS also criticized our measure of health care provider influence as not including the proportion of board members who are health care professionals. This criticism apparently resulted from a Department oversight. Our sensitivity analyses (see p. 19, board classification D) used a proportion of public influence measure; the complement of this classification is that suggested by the Department. We also used three additional measures not noted by the Department. Our basic public representation classification was requested by the Subcommittee.

plan was significant in explaining allowance differences in 4 of the 17 procedures we examined. 1/

Our analysis using 45 plans also showed this factor was statistically significant in explaining differences in allowances for four procedures. 2/ Plans having higher percentages of participating physicians generally had lower allowances for the procedures noted.

UCR systems

Our 64-plan analysis showed that whether a plan used a UCR system to establish reimbursement rates for physicians was significant in explaining differences in allowances for 2 of the 17 procedures. 3/ In contrast, our 45-plan analysis showed that this factor was significant in explaining the differences in allowances for 4 of the 17 procedures. 4/ In both cases the statistically significant associations indicated that plans having UCR systems were associated with higher allowances for the noted procedures than those plans which did not use the systems.

Malpractice insurance rates

Our 64-plan analysis showed that for two procedures, 5/ plans in States where higher malpractice rates were in effect generally were associated with higher customary allowances.

1/The procedures with which percentage of participating physicians showed a significant relationship with customary allowances were dilation and curretage, anesthesia for tonsillectomy, blood urea nitrogen, and consultation.

2/These procedures were appendectomy, cholecystectomy, dilation and curretage, and total hysterectomy.

3/The two procedures were anesthesia for tonsillectomy and pap smear.

4/The four procedures were dilation and curretage, total hysterectomy, anesthesia for tonsillectomy, and anesthesia for appendectomy.

5/These procedures were anesthesia for tonsillectomy and electrocardiogram.

never significant at the 0.95 confidence level in explaining differences in 1977 customary allowances when we analyzed 64 plans and was significant for only one procedure when we analyzed 45 plans.

In addition to these analyses, we examined other issues and approaches suggested by various groups who reviewed our draft report. In general, the additional analyses supported our conclusions that public representation was not found an important explainer of differences in 1977 allowance levels. (See app. VIII for further discussion of our sensitivity analyses.)

ASSOCIATION OF OTHER FACTORS WITH DIFFERENCES IN ALLOWANCES VARIED IN THE TWO ANALYSES

Our 64- and 45-plan analyses showed that the statistical significance of the factors discussed below varied.

Percentage of population covered

The percentage of the population residing in the plans' service area that was insured by the Blue Shield plan was more often a significant factor in explaining differences in the 64 plans' 1977 customary allowances than any other factor we examined. This factor was significant in explaining allowance differences in 8 of the 17 procedures we analyzed. 1/ In our 45-plan analysis, this factor was statistically significant for 3 of the 17 procedures we analyzed. 2/ The analyses showed that the larger the percentage of an area's population a Blue Shield plan covered, the lower the customary allowances for those procedures.

1/The procedures in which percentage of area population covered by Blue Shield showed a significant relationship were appendectomy, cholecystectomy, total hysterectomy, complete obstetrical care, anesthesia for total hysterectomy, pap smear, blood urea nitrogen, and intermediate hospital visit.

2/The procedures were blood urea nitrogen, urinalysis, and pap smear.

information provided by the plan serving Nevada because we did not obtain information on another factor needed for the analyses for that area.

Additionally, we reviewed relevant congressional hearings and reports and research literature and consulted with others who had an interest in the question posed by the Subcommittee.

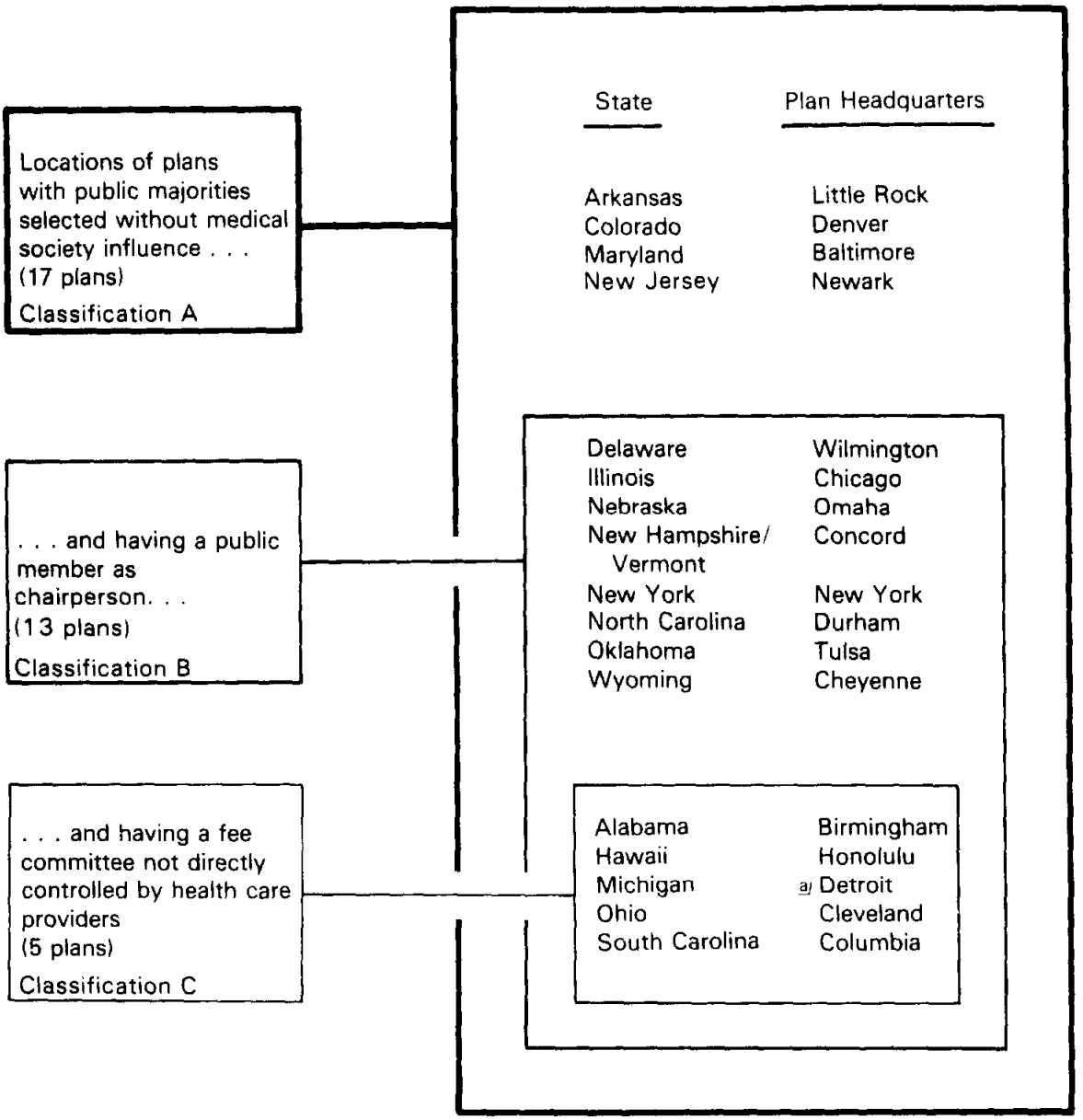
Table 2

Locations of 45 Plans with One Payment Area Each
(June 1977)

State	Plan headquarters
1. Arizona	Phoenix
2. Arkansas	Little Rock
3. Colorado	Denver
4. Connecticut	New Haven
5. Delaware	Wilmington
6. District of Columbia	Washington
7. Georgia	Atlanta
8. "	Columbus
9. Hawaii	Honolulu
10. Idaho	Lewiston
11. Iowa	Des Moines
12. Kansas	Topeka
13. Maine	Portland
14. Massachusetts	Boston
15. Minnesota	St. Paul
16. Mississippi	Jackson
17. Missouri	Kansas City
18. "	St. Louis
19. Montana	Helena
20. New Mexico	Albuquerque
21. New York	Albany
22. "	Buffalo
23. "	Rochester
24. "	Utica
25. North Carolina	Durham
26. North Dakota	Fargo
27. Ohio	Cleveland
28. Oklahoma	Tulsa
29. Oregon	Portland
30. Rhode Island	Providence
31. South Carolina	Columbia
32. South Dakota	Sioux Falls
33. Tennessee	Memphis
34. Utah	Salt Lake City
35. Virginia	Roanoke

Table 1

Locations of Blue Shield Plans with Public Majorities Selected Without Medical Society Influence (June 1977)



a/ Although this plan met the criteria indicated, it was not used in the analyses because we lacked necessary information about the plan.

SENSITIVITY ANALYSES

We changed some board control classifications and explanatory factors and made other changes to see how the results of our 64-plan analysis would change. This procedure--called sensitivity analysis--allows one to judge the importance of each change. We made two additional sets of analyses.

First, we tested the sensitivity of our 64-plan analysis to

--changing how we classified board control,

--adding a cost-of-living estimate, and

--lowering the confidence level to 0.90.

Second, we substituted a measure of medical society influence on board member selection for the basic definition of board composition. We also substituted a factor denoting the degree of affiliation between Blue Cross and Blue Shield plans for the percentage of participating physicians factor. We then made sensitivity analyses like those noted above.

Finally, we performed additional sensitivity analyses to test specific questions of interest. For example, in some analyses, we used the average customary allowance when plans had more than one payment area. Results of our sensitivity analyses are discussed in appendix VIII.

Additional classifications of plan boards

Besides our basic classification of board composition, we developed four more classifications to test the sensitivity of our results to changes in our basic definition.

Our basic definition of board control classified as public, those boards that had a public majority whose public members had been selected without medical society involvement. We call this classification A. The four other board control classifications we developed are:

Classification	Criteria
B	Boards that met the criterion in classification A and had a chairperson who was classified as a public representative; 13 of 64 boards met these criteria.

simple procedures that represented several types of health care service. We chose simple procedures so that the matching of procedure codes would not present a major problem when collecting data from the plans, not all of which used the same procedure coding system. We chose procedures frequently performed so that we would not have to rely on limited data from plans which had reimbursed physicians infrequently for certain procedures. We selected 17 procedures from the 4,000 to 7,000 possibilities in an attempt to give us a relatively large percentage of the dollars the plans paid for health care. We estimated that the amounts paid for these procedures accounted for over 11 percent of the 1977 Blue Shield reimbursements within the Federal Employees Health Benefits program.

Consumer demand

Our analyses did not include separate equations to address both demand and supply considerations in the establishment of customary allowances. Rather, we assumed that because of insurance coverage, such as that provided by Blue Shield plans, demand for medical services by consumers does not seriously affect customary allowance levels so that developing both a supply and a demand equation to be solved simultaneously was not necessary.

Relation between boards and allowance levels

We assumed that since a board of directors may make policy on allowance levels, or in some cases is charged with establishing or approving a plan's reimbursement levels, the incumbent board was responsible for allowance levels in effect when the board governed the plan. Our analyses compared boards as composed in June 1977 with allowances effective at that time.

LIMITATIONS

Our study was subject to several limitations. Some of these resulted from the nature of the study itself, and others resulted from limitations in available information. Limitations on our analyses included the following:

--Type of analysis: Regression analysis shows association or relationship; it does not indicate causality.

We assumed that plans' policies on how frequently to update the customary allowances and the percentile at which to set them were reflected in the amounts allowed for various procedures. For plans that did not have customary allowances, we substituted the plans' fee schedule allowances.

We recognize that using the highest allowance from plans with more than one payment area may present analytical difficulties. For example, using the highest allowance could obscure cost-containment practices represented by lower allowances. Not knowing the distribution of the plans' payments, however, we did not know which allowance to select as representative of a plan's payment experience. Consequently, since physicians are concentrated in urban areas, which generally have higher costs, we thought it reasonable to believe that more procedures are performed where allowance levels are higher. Additionally, to ameliorate this potential problem we performed analyses (1) using data only from single payment area plans and (2) substituting an average customary allowance from plans having more than one payment area.

Before using the plans' highest allowances as indicators of cost-containment efforts, we considered several alternatives. These alternatives included (1) comparative summaries of the plans' cost-containment reports prepared by the Blue Shield Association, (2) the plans' average payments for selected procedures for persons receiving benefits under the Service Benefit Plan of the Federal Employees Health Benefits program, and (3) the total amount of benefits paid for each high-option Federal enrollee contract at the various plans.

Each of these alternatives could have provided additional measures of the plans' cost-containment efforts, but Blue Shield officials were unable to vouch for the accuracy or consistency of the plans' data on these measures. In the case of total benefits paid for each high-option Federal enrollee contract, for example, Blue Shield officials told us that they were unsure of their estimates of the number of contracts at each plan. This problem was said to be more serious at plans like the Washington, D.C., plan, which served enrollees from more than one State. Using information from the Federal employees program would have also required us to assume that Federal employees' use of health care services was representative of all Blue Shield enrollees.

ASSUMPTIONS

We made assumptions about the following factors or conditions in our analyses:

--The degree of provider or public representation on a board that was necessary to control or strongly influence the boards' decisions affecting cost-containment efforts.

--An appropriate measure of the plans' cost-containment efforts.

--The effect of consumer demand on the establishment of customary allowances.

--The relationship between boards and allowance levels.

Board control

The question of measuring influence or power in similar settings has long been the subject of debate in the social science community. One scholar, for example, has argued that individuals who are influential in one activity tend not to be influential in another. Influence seems to be a function of durable interests or concerns, which can be traced initially to professional or occupational goals or striving. 1/

On Blue Shield boards then, physicians or other providers could exert disproportionate influence on physician reimbursement rates or other issues related to medical practice. Likewise, a board member from a labor group might be more influential in establishing a plan's wage or personnel policies.

Furthermore, influence may be covert, as well as overt, in that it may occur when individuals or groups prevent issues from arising which may threaten their interests. 2/ For

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1/Dahl, Robert A., Who Governs? New Haven, Conn.: Yale University Press, 1961.

2/Bachrach, Peter, and Baratz, Morton S., "Two Faces of Power," American Political Science Review, LVII (December, 1962), 947-952. See also Marvin E. Shaw, Group Dynamics: The Psychology of Small Group Behavior, New York: McGraw-Hill, 1976, pp. 262-272.

--Malpractice insurance rates in the plan area.

--The presence or absence of a State tax on the plans' premiums.

Appendix VI, page 70, provides the sources for these data.

We selected these factors based partly on their inclusion in other research studies and on our judgment of which were important. Appendix VI provides information on our original set of explanatory factors and how we selected the seven factors used in the analyses from the larger set. Definitions of the seven factors used follow:

1. Percentage of population covered - the percentage of persons living in the area served by the Blue Shield plan who had health insurance provided by the plan in 1977. We excluded persons covered by Medicare and Medicaid. Responses to our questionnaire showed that the percentage of population covered ranged from 5 percent (Blue Shield of California) to 80 percent (Blue Shield of the Rochester Area).

2. Plan size - whether a plan had over 1 million subscribers. Such plans were classified as large plans. In 1977, 22 plans met this criterion.

3. Income per capita - the 1973 income per individual living in the area served by the Blue Shield plan after deduction of Federal, State, and local income taxes. The income per capita of plan area residents ranged from $2,945 (Blue Cross and Blue Shield of Mississippi) to $5,744 (Blue Shield Plan of the National Capital Area) for the 66 plans which responded to our questionnaire. The average income per capita was about $3,988; about half the plans had an income per capita of more than $3,901, and about half had less.

4. Percentage of participating physicians - the percentage of the physicians in a plan's service area who in 1977 had participating agreements with the plan. The agreements usually included a provision to accept the plan's UCR or other allowance as payment in full. Responses to our questionnaire showed that the percentage of participating physicians ranged from 0 percent (13 plans) to 100 percent (3 plans) among the

CHAPTER 2

HOW WE DID OUR STUDY

We analyzed the relationship between public representation on Blue Shield plans' boards of directors and differences in the plans' cost-containment efforts as indicated by plans' customary allowances for 17 health care procedures. 1/ In addition we examined several other factors that we believed might affect the plans' allowance levels. We also examined the association between a measure of medical society influence on selection of the plans' boards and differences in the plans' customary allowances.

Plans' establishment of geographic areas for payment purposes varies. Nineteen plans we analyzed had more than one payment area, and 45 plans had only one payment area in 1977. We developed two sets of analyses because of these circumstances. One set included 64 plans; 2/ the other set included only those 45 plans having single payment areas.

Because of the statistical nature of our analyses, we had to make several assumptions and define our terms in ways amenable to quantitative analysis. Our analyses were limited by our methods and by the availability of information on various factors we used to describe the environment in which the plans operated.

ANALYSES OF 64 PLANS

Our 64-plan analyses were to determine if public control of Blue Shield plans' boards of directors was statistically significant 3/ in explaining differences in the plans' cost-containment efforts, other things being equal.

1/See page 15.

2/Although 66 plans responded to our questionnaire (app. III), we obtained information sufficient for analyses on only 64 plans (see pp. 23 and 24).

3/Statistical significance is defined on page 62.

UCR allowances will also rise faster if they are updated more frequently.

Plans may also set policies on whether they will pay physicians differently depending on whether they are "participating" physicians. The Blue Shield plan in Hawaii, for example, reimburses participating physicians by setting customary allowances at the 90th percentile, while the nonparticipating physician customary allowances have been set at the 75th percentile. A participating physician is one who has an agreement with the plan which generally stipulates that the physician will accept the plan's payment as payment in full and will not bill the patient for any unpaid amount.

Thus, despite national Blue Shield standards, there is considerable local prerogative on how to implement a UCR system. Acting within the scope of national standards, a plan's board can effectively raise or lower the amounts it will reimburse physicians.

COMPOSITION OF BLUE SHIELD PLANS' BOARDS OF DIRECTORS

As of June 1977, the boards of directors of all 66 Blue Shield plans whose representatives responded to our questionnaire (see app. IV) had both provider and public representatives. "Provider" member included physicians, osteopaths, dentists, other licensed providers, hospital representatives, and others who had major medical training or employment. "Public" members were those who did not qualify as providers. The average number of active members of a Blue Shield plan's board of directors was 25. Of these, an average of 14 were provider representatives and 11 were public representatives.

Forty-one plans had provider member majorities; 19 had public member majorities; and 6 had equal representations of public and provider members. Public representatives comprised from 13 to 79 percent of board memberships in 1977.

In 35 of the 66 plans, medical societies influenced the selection of board members. In these 35 plans, the medical society, medical society members, or a committee of the society, nominated, appointed, elected, ratified, or in some other formal way influenced board member selection.

"A reasonable fee is one which meets the usual and customary criteria, or which, in the opinion of an appropriate peer review committee, merits special consideration based upon the complexity of treatment of the particular case."

Our earlier review 1/ showed that the plans' development and application of UCR systems varied. Under the UCR system, however, a plan generally is to pay a doctor the least of the actual charge, the usual fee, or the customary fee. The following table illustrates how the system should work.

Physician's bill	Physician's usual fee	Area/ specialty customary allowance	Blue Shield payment
$25	$30	$40	$25
30	30	40	30
40	30	40	30
50	40	35	35

Setting a plan's UCR policy can be complex and can affect the plan's reimbursement levels. As the body responsible for general plan policy (or as the body sometimes specifically charged with establishing or approving the reimbursement levels a plan will use), a Blue Shield plan's board of directors has to make or approve decisions that will affect how the UCR system will be established and administered. Thus, board decisions affect how much physicians and other providers will be reimbursed for covered services. Establishing a UCR system and policy can involve decisions on

--how to define "usual" charges,

--at what level to set the "customary allowance,"

--whether to pay specialists differently from non-specialists,

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1/"More Civil Service Commission Supervision Needed to Control Health Insurance Costs for Federal Employees" (HRD-76-174, Jan. 14, 1977).

individual Blue Shield plans were controlled by the group that benefited most directly--health care providers--but the Subcommittee did not measure the effect of this conflict of interest on costs or cost-containment efforts.

HHS has been interested in potential conflicts of interest "which exist when physicians, hospital administrators, and other persons with a financial interest in the delivery of health care services control the board of directors" of organizations that administer payments under the Medicare or Medicaid programs. In 1977, 32 Blue Shield plans served as agents of the Medicare program, and 14 served as agents of the Medicaid program. In June 1978, HHS requested comments from interested parties on a proposal to issue a regulation that would require a majority of the board of directors of any carrier, intermediary, or fiscal agent participating in the two programs be "public representatives." HHS had not taken any additional formal action as of December 1, 1980.

FTC has been interested in medical influence on Blue Shield plans' boards of directors. FTC's Bureau of Competition issued a staff report in April 1979, which focused on the extent, impact, and legality of medical participation in the control of Blue Shield plans. According to the report, physicians and physician organizations were able to control or influence economically significant decisions made by the plans.

In November 1979, FTC's Bureau of Economics issued a report addressing the issue of physician control of Blue Shield plans. It said that plans where the local medical society was involved in nominating, electing, or approving board members had average fee limits more than 16 percent higher than plans that had no medical society involvement. The report found that other measures of physician involvement with Blue Shield plans' boards were also associated with increases in the "average procedure price." 1/

SIZE OF BLUE SHIELD PLANS

Blue Shield plans constitute the largest single medical benefits third-party payer in the country. According to the

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1/FTC staff provided comments on our report. (See ch. 4 and app. I.)

COMMENTS ON GAO'S ANALYSES

Two Federal Trade Commission bureaus, the Department of Health and Human Services, and the Blue Shield Association reviewed and commented on a draft of this report. (See apps. I, II, and III.)

The Federal Trade Commission staff was generally critical of GAO's findings, its classification of certain boards as not subject to medical society influence, and several aspects of its methodology. The two other commentors stated, as did the Federal Trade Commission staff, that GAO should consider "pooling" information to analyze the 17 health care procedures simultaneously instead of separately. The Blue Shield Association commented that GAO study results were not inconsistent with results obtained in a separate study made by the Association.

GAO's study was directed primarily to public representation on boards, not medical influence as the Federal Trade Commission staff said the draft report had implied. As a result of the agency's comments, however, GAO refined its classification of boards subject to medical society influence. GAO made additional analyses and tests to address the concerns about the methodology. As a result of this further work, GAO concluded that neither public representation on boards of directors of Blue Shield plans nor medical society influence on selection of board members was found important in explaining differences in 1977 allowances.

Additionally, in response to methodological concerns, GAO made analyses using only 45 plans which had a single payment area covering each plan's entire service area. The analyses were made using both separate equations and the suggested pooled data approach. The results of the pooled analyses for single payment area plans showed that boards

that plans (1) having payment systems based on usual, customary, and reasonable charges and (2) located in areas with higher malpractice insurance rates were associated with higher allowance levels. Like the 64-plan analyses, the 45-plan analyses also showed that increasing percentages of physicians having agreements with the plans were associated with lower allowance levels. Both sets of analyses showed that whether a plan's premium was subject to State tax was rarely statistically significant in explaining differences in the allowances. (See pp. 26 to 29.)

HOW THE STUDY WAS CONDUCTED

GAO found these relationships as the result of analyses conducted at the request of the Subcommittee on Compensation and Employee Benefits, House Committee on Post Office and Civil Service. The Subcommittee asked GAO to determine whether there was an ascertainable difference in cost-containment efforts between Blue Shield plans controlled by public members and those controlled by physicians or other health care provider members. (See p. 1.)

Social scientists believe that it is extremely difficult to measure influence in similar settings with any degree of certainty because of its many facets. However, in an attempt to shed some light on this issue for the Subcommittee, GAO developed a statistical model to determine whether, given certain limiting assumptions, any definitive information could be developed about the many factors, including board composition, which may be associated with allowance levels.

As the primary measure of the Blue Shield plans' cost-containment efforts, the study used the maximum allowable amounts that could be paid to physicians. While GAO

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