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INTEGRATING RESULTS OF
PHYSICIAN PRACTICE COST
SURVEYS

Final Report

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INTEGRATING RESULTS OF PHYSICIAN PRACTICE COST SURVEYS

1.0 INTRODUCTION

The Health Care Financing Administration (HCFA) relies on physician data for multiple policy and research objectives. Physician practice cost and income data are used to update the Medicare Economic Index (MEI) and the Geographic Practice Cost Index (GPCI), both important elements in the determination of physician reimbursement. In addition, data on physician practice characteristics and costs have enabled researchers and policy makers to better understand the complexities of medical practice. With the phase-in of the Medicare Fee Schedule in 1992, HCFA's needs for accurate physician practice cost data extend beyond MEI and GPCI updates and refinements. Additionally, the impacts of the fee schedule on physicians will need to be assessed.

Currently, HCFA requires a coordinated effort to assess its current and future data needs, to evaluate the data sources that can be used to meet current data needs, and to develop data strategies to meet future data needs. Under a Cooperative Agreement with HCFA, the Center for Health Economics Research (CHER) is conducting such a study. The first phase of this study involved an assessment of physician practice cost data needs (Rosenbach, 1992). The second phase involved an inventory of physician practice cost data sources (Schneider, Ammering, and Rosenbach, 1992).

This report presents the results of the third and final phase of the project: an evaluation and integration of two physician surveys -- HCFA's 1988 Physicians' Practice Costs and Income Survey (PPCIS) and the American Medical Association's (AMA) 1989 Socioeconomic Monitoring System (SMS). This report presents three types of findings:

- comparability of the PPCIS and SMS survey designs (questionnaire, sample, methodology),
- comparability of the PPCIS and SMS survey data (item nonresponse rates, means, medians, frequency distributions), and
- methodology for combining the two samples, including the development of new weights.

This comparison and combining of the two databases is now possible because of the availability of public use data from the American Medical Association.* This represents the first formal comparison of the two data sources, to our knowledge. Previously, only means and frequencies were available in the Socioeconomic Characteristics of Medical Practice series, published annually by the AMA. Little is published about the comparability of responses on key variables and the extent to which questionnaire wording or data collection methodology can affect the responses. Much of the information contained in this report about the SMS sample design and questionnaire content was obtained through personal communications with the survey staff at the AMA (we are especially indebted to Sara Thran for her assistance).

We had considered a similar comparison with the National 1987 Survey of Physicians, conducted for the Physician Payment Review Commission (PPRC) by Westat and Project Hope. However, the published documentation on the file construction, sample design, and weighting methodology was inadequate to permit us to perform the sample cumulation. The original staff were unable to assist us with additional, unpublished information. Moreover, we found that the complexity of cumulating three samples was beyond the scope of the present effort, given the vast differences in eligibility criteria, questionnaire wording, survey methods, and file layout between the PPRC survey and the two other surveys.

Therefore, this study is limited to a comparison of the PPCIS and SMS. Chapter 2 ✓ compares the two surveys according to their survey design (sample, questionnaire, methods). Chapter 3 compares simple descriptive statistics produced from the two surveys (item nonresponse, means, medians, frequency distributions). Where we observe significant differences between the two surveys, attempts are made to explain these differences based on the questionnaire wording or other factors. Chapter 4 discusses the methodology used to combine the two samples into a single database. Alternative weighting procedures are presented and evaluated. Finally, Chapter 5 discusses the implications of this study. Tables are presented at the end of each chapter.

*The public use tape for the 1989 SMS was purchased from the AMA for \$5,000.

2.0 DATA DESCRIPTION

Two sources of physician practice costs data were selected for this analysis: the 1988 Physician Practice Costs and Income Survey (PPCIS), sponsored by the Health Care Financing Administration (HCFA) and the 1989 Socioeconomic Monitoring System (SMS) sponsored by the American Medical Association (AMA). Both surveys are national in scope and collect a wealth of physician-level (and group-level) data including physician demographic characteristics, practice expenses, and practice characteristics. Both surveys have been conducted periodically during the last ten years.

Each survey will be discussed in detail below. Also, important issues regarding survey comparability will be discussed. Finally, the last part of this chapter will discuss the construction of the combined database, with particular attention given to variable construction.

2.1 1988 Physicians' Practice Costs and Income Survey

HCFA has undertaken several national surveys of physicians dating back to the mid-1970s. The 1988 PPCIS, the most recent of the PPCIS surveys, is part of a continuing effort to collect data pertaining to physicians' practice patterns, productivity, practice costs, incomes, and Medicare participation.

The American Medical Association's Physician Masterfile, a comprehensive file of all physicians practicing in the U.S., was used as the sampling frame. A nationally-representative sample, stratified by specialty, Census Division, and urban/rural location, was randomly selected from the Masterfile. Physicians from rural areas were oversampled, as were gastroenterologists, orthopedic surgeons, cardiologists, urologists, cardiothoracic surgeons, and "other" surgical specialists. General and family practitioners, internists, and other medical specialists were undersampled.

To be eligible for the survey, physicians had to meet the following criteria:

- (1) currently provide patient care services for at least 20 hours per week;
- (2) not currently a resident, clinical fellow or research fellow;

- (3) not employed by a faculty practice plan, hospital, clinic or HMO, or by a Federal Government agency in 1988;
- (4) if in a multipractice arrangement, greater than 80 percent of income must be from the practice in which the physician was full or part owner or employee;
- (5) have spent at least twenty hours per week in patient care (or services) during 1988; and
- (6) have been in the same private practice for all of 1988.

The final number of completed cases was 3,505, achieving an overall response rate of 61 percent. Of the total sample screened, 36 percent, or 3,015 physicians were ineligible to participate and were thus excluded from the survey. Most of these physicians were ineligible because of their employment arrangement. Sample weights adjust for (1) over- and undersampling of selected groups of physicians; and (2) differential nonresponse rates between subgroups. These weights enable projections to the national population of physicians.

The 1988 PPCIS is divided into eleven sections: employment, productivity, practice size, practice costs, practice revenue, net income, malpractice, Medicare, demographics, and an equipment supplement. For a complete discussion of survey methodology and components, refer to Thalji, et al., (1991) and Dayhoff et al., (1992).

Employment questions were used to verify the physicians' eligibility for the survey. In addition, the screener verified information on specialty, and recorded information on practice type (sole proprietor, partnership or corporation and single specialty or multispecialty). Productivity questions gathered information such as the total hours worked during the most recent full week of practice, the breakdown of these hours by activity, and the number of patients seen in different settings.

The practice size section recorded information on the number of physician owners, physician employees, and nonphysicians employed in the practice. It also distinguishes full-time from part-time workers.

The practice cost section asks for detailed information on 18 types of physician practice costs, including gross wages, deferred compensation and bonuses, and fringe benefits reported separately for all physicians in the practice, physician employees, and nonphysician employees. Other questions inquired about expenses for office space (rental/lease, depreciation/interest, utilities/ telephone), medical equipment, medical supplies, malpractice

premiums, automobile depreciation/leasing, continuing education, and miscellaneous items. Physicians were requested to provide cost data for their entire practice, rather than their own share of costs (if possible).

The net income section of the survey first asked physicians to provide an exact value for their own personal net income from all medical activities. If no exact amount was given, physicians were allowed to indicate a range within which their income fell. Physicians were then asked to provide either the percentage or the amount of their net income from medical activities other than their main practice. The malpractice questions asked for information on premiums paid for malpractice insurance and the limits of liability coverage.

The Medicare section first asked physicians about the percentages of revenues from patients with different types of health coverage (e.g., Medicare, Medicaid, private insurance, uninsured). Physicians were then asked whether they had signed the Medicare participation agreement and about billing patterns for Medicare beneficiaries. The core questionnaire concluded by asking physicians to identify their race/ethnicity. Finally, a supplement to the survey asked detailed questions about the patterns of use and expenses for medical equipment.

The survey was conducted by the National Opinion Research Center (NORC), a social science research center affiliated with the University of Chicago, during an eight month period beginning July 1989 and ending March 1990. The questionnaire was administered using three modes. A little more than half (1,769) of the interviews were completed on hard-copy survey instruments. Another 1,726 interviews were conducted using computer-assisted telephone interviewing (CATI). The average telephone interview lasted about 45 minutes. Finally, abbreviated mail questionnaires were completed by 10 respondents.

2.2 1989 Socioeconomic Monitoring System

The AMA's Socioeconomic Monitoring System (SMS) is a national survey of physicians, collecting data pertaining to practice characteristics, productivity, expenses, income, fees, and practice patterns (Gonzalez and Emmons, 1989). The survey has been conducted annually since 1981. Before then, the Periodic Survey of Physicians (PSP) collected similar data. The SMS consists of a Core Survey and a Supplemental Survey. The

Supplemental Survey focuses on special topics, typically those that require more frequent collection. The Core Survey is the larger component and collects current data on a range of economic and practice characteristics each year. Core Surveys collect the same information each year. However, only the core survey data are included in the Public Use File. The 1989 Core Survey was chosen for this analysis because the expense data pertain to the calendar year 1988 and the productivity data pertain to 1989, which is the same time frame as the PPCIS.

The AMA's Physician Masterfile was used as the sampling frame. A nationally representative sample was randomly selected from the Masterfile. Sample sizes within each specialty/region cell were verified to ensure that cells were proportional to the physician population (Thran, 1992).^{*} To be eligible for the survey, physicians had to meet the following criteria:

- (1) Currently provide patient care for 20 or more hours per week.
- (2) **CANNOT** be a resident.
- (3) Must be nonfederal.
- (4) **CANNOT** be a Doctor of Osteopathy.

The final number of completed cases for the 1989 Core Survey was 4,104, achieving an overall response rate of 72 percent. Of the 4,104 cases, 3,448 were either full or part owners of their medical practice or employed by another physician or group of physicians (i.e., the number of cases with eligibility comparable to the PPCIS). Another 656 physicians were employed by hospitals, clinics, HMOs, etc. Relative sample weights adjust for unit nonresponse and eligibility; these weights do not enable projections to the national population of physicians (Gonzalez and Emmons, 1989). The survey was fielded from March 1989 through August 1989.

^{*}Previously, the SMS was described by the AMA as a "stratified random sample" (see Socioeconomic Characteristics of Medical Practice, 1989). In a more recent publication (Physician Marketplace Statistics, 1991), the description of the sample changed to simply a "random sample." Personal communication with the AMA's Sara Thran (June, 1992) clarified that the sampling is not stratified; however, the distributions within specialty and region are checked against Masterfile distributions to ensure national representation.

The 1989 Core SMS collected information very **similar to that of the** PPCIS. The **survey** was divided into eight sections: employment, practice characteristics, productivity, fees for selected visits, hospital utilization, income and expenses, professional liability, and referrals (Gonzalez and Emmons, 1989). The employment, practice characteristics, productivity, and expense questions are very comparable to corresponding questions on the PPCIS.

Section 2.4.3 compares the questionnaire content between the two surveys. The principle differences between the SMS and the PPCIS in terms of survey content is that the SMS collected detailed information on usual fees for selected services, such as office visits and inpatient hospital visits; the number of patients discharged from the hospital and average lengths of stay; and referral patterns.

2.3 Survey Comparability

This section compares the PPCIS and the SMS along a number of important dimensions, including eligibility criteria, sample design, data collection procedures, and weighting methods. Within each of these potential areas of difference, there is a further distinction between differences that are correctable versus those that are not correctable.

2.3.1 Overview

Table 2-1 compares the two surveys on a number of characteristics. Data collection procedures were similar for the two surveys -- each relied predominantly on telephone interviewing with a mail questionnaire available for hard-to-reach or very busy physicians. Less than one percent (10) of the PPCIS interviews were completed via mail questionnaires versus 5.5 percent (224) in the SMS. While nearly the entire SMS was conducted using CATI (only 4.6 percent of cases were completed on hard copy), the PPCIS completed just over half of its interviews using hardcopy questionnaires.

Both surveys used the same sampling frame, however they project to different national populations of physicians. The PPCIS projected to a physician population of 217,970. The SMS, after controlling for differences in eligibility (by employment status only) is based on a population of roughly 300,000 physicians. The reasons for these differences are not known.

Finally, unit nonresponse rates were different for the two surveys: 61 percent for the PPCIS and 72 percent for **the SMS**; an **eleven percentage point difference**. One of the factors in the higher response rate in the SMS may be the inclusion of hospital- and clinic-based employees who are typically easier to reach and are not asked sensitive questions related to practice expenses and fees.*

2.3.2 Eligibility Criteria

The PPCIS is more restrictive in its eligibility criteria (Table 2-1). The PPCIS requires that physicians be full or part owners of their main practice in 1988, or have been employed by another physician or group of physicians. The SMS does not have any requirements regarding employment status, with the exception of the exclusion of employees of the Federal government.

Fortunately, this is a “correctable” difference because the SMS contains a variable describing physicians’ employment status. If they are employed, another variable indicates the type of employer (i.e., HMO, **ambulatory/surgical/ER center**, physician or group of physicians, private hospital, medical school, university/college, state/local government, or “other”). Therefore, to achieve comparability by employment status, we subsetted the SMS to only include physicians who are either full or part owners of their main practice or employed by a physician **or group of physicians. This reduces the SMS sample size from 4,104 to 3,448.**

The PPCIS also requires that physicians in multipractice arrangements derive at least 80 percent of their income from the practice in which the physician is a full or part-owner, or employee. This eligibility difference cannot be corrected for on the SMS; however, so few physicians (n=5, or 0.1% of all physicians screened) were deemed ineligible because of this restriction that it is likely to have a negligible effect on sample combination.

“Physicians were skipped from the fee questions based on specialty (psychiatry, radiology, anesthesiology, and pathology) rather than employment status; however, a large proportion of the specialties skipped **are likely to have been employed by a hospital or clinic.**”

Both surveys required that participants currently provide patient care (or services) for at least twenty hours per week. The two surveys were fielded mostly in 1989, therefore this “activity” screen did not apply to the same year as the cost data (1988). For this reason, the PPCIS included an additional requirement that physicians had to have provided patient care **for at least twenty hours per week during 1988**. The PPCIS **excluded 27** physicians based on this requirement--0.3 percent of all physicians screened. Again, it was not possible to adjust the SMS to correct for this difference; however, given the small number of cases excluded from the PPCIS as a result of this restriction, it is **unlikely** to have a large effect.

Finally, the PPCIS excluded physicians that were not in the same private practice for all of 1988. A total of 254 (3 percent) of all screened physicians were excluded on the basis of this requirement; unfortunately, it is not possible to impose (ex post) this restriction on the SMS. Moreover, it is unknown what effect this has on the PPCIS sample. The PPCIS exclusion of physicians who changed practices during 1988 may have a beneficial effect on item response rates, however.

2.3.3 Sampling and Weighting Methods

The principal difference in sampling methods is that the PPCIS was a stratified random sample (stratified by specialty, region, and urbanicity), with over- and under-sampling to provide adequate cell sizes for each stratum, **while** the SMS was a simple random sample with w-stratification weighting (Table 2-1). This sampling difference is of particular importance for the reweighting of the combined sample (Chapter 4).

The SMS weighting methodology differs from that of the PPCIS. SMS weights account for unit nonresponse (ratio of target population to sample population) and eligibility (ratio of target eligibility to sample eligibility). The weights sum to the number of observations (i.e., relative weights).

In contrast, the PPCIS weights have three dimensions. First, like the SMS, PPCIS weights adjust for differential unit nonresponse. Second, since the PPCIS was a stratified random sample with over- and under -sampling of certain specialties and levels of urbanicity, sampling weights correct for the disproportionate probability of selection. Finally, unlike

the SMS weights, the PPCIS weights enable projections to the national population of physicians (the “target” population).

2.4 Constructing a Combined Database

Creating the combined database required four steps. The first step was to subset the SMS by excluding (from the SMS) physicians employed by an entity other than another physician or group of physicians (i.e., delete where EMPLOYER not equal to 3). The resulting sample size for the SMS was 3,448. The second step involved creating a uniform set of strata (by specialty, region, and urbanidty), and the third step involved the construction of a comparable set of analytic variables, such as basic physician characteristics, productivity measures, and practice expenses. These two steps were complex and will be discussed in detail below. The final step was to combine the two files, resulting in a total combined sample of 6,953 physicians (3,505 from the PPCIS and 3,448 from the SMS).

2.4.1 Content of Combined File

A mix of variables were selected from each survey to be included in the combined database. Practice expenses were the primary elements; however, other variables that are often analyzed in conjunction with practice expenses are also included, such as physician/practice characteristics, productivity measures, and net income from medical practice. Table 2-2 summarizes the selected variables -- showing the generic variable description, the combined file variable name, and the original “source” variables from each of the two surveys.

2.4.2 Defining Comparable Strata

It was necessary to define a comparable set of strata for two reasons. The first reason is that many analyses of the combined data set will involve cross-tabulations by specialty, region, and urbanicity. Such tabulations are meaningless unless the definitions of the strata are consistent across the two surveys. The second reason is that comparable strata are

required to compute a new set of weights for the combined sample (discussed in Chapter 4). In order to develop new weights, it was necessary to post-stratify by specialty, region, and urbanicity.

Constructing comparable measures of region and urbanicity was relatively straightforward (Table 2-3). The four Census regions -- Northeast, North Central, South, and West -- were defined identically on both surveys. The corresponding variable on the PPCIS was named "REGION" and the SMS variable was called "ZCENREG."

There are notable differences among the surveys regarding the definitions of urbanicity. The AMA file is the most restrictive, with nine urbanicity categories but no county/MSA or zipcode level information. The PPCIS urbanicity variable includes three categories: nonMSA, small MSA (less than 1 million households), and large MSA (greater than 1 million households). The PPCIS also includes a dichotomous MSA (urban)/nonMSA (rural) variable. The nine urbanicity categories provided on the SMS offer enough detail to group "ZCNTYCD" into two groups comparable to the PPCIS MSA/nonMSA dichotomy: rural is defined as ZCNTYCD=(1,2,3, or 4) and urban is defined as ZCNTYCD=(5,6,7,8, or 9). The SMS category #5 of ZCNTYCD referred to "potential MSAs." After consultation with AMA staff, we elected to group "potential MSAs" with urban counties.

Specialty was the most troublesome variable to crosswalk. The SMS Public Use tape does not provide the same level of specialty detail as the PPCIS. The SMS has only a thirteen category specialty variable, while the PPCIS identifies 80 detailed categories. Fortunately, a crosswalk provided by the AMA identified the detailed specialties that comprise each of the thirteen categories, enabling the PPCIS to be "mapped into" the SMS to form thirteen comparable categories (Table 2-3). It should be noted that neither survey excluded any cases on the basis of specialty. Attempts to obtain more detailed specialty information from the AMA were unsuccessful due to confidentiality issues.

2.4.3 Define Comuarable Analytic Variables

Table 2-4 provides side-by-side comparisons of the questions that comprise each analytic variable selected for the combined database. In many cases, variables are taken

directly from the respective Public Use Tapes; however, in some cases variable construction was required to achieve comparability.

Net Income. Physician net income is a valuable addition to the combined file because it enables an approximation of physicians' own wages -- potentially the single largest component of practice expenses. Both the PPCIS and SMS surveys asked for net income from **medical practice**, after expenses but before taxes. The primary difference between the two questions is that on the PPCIS, if physicians could not respond with an exact figure they were probed with a range. To create a continuous net income variable, the mid-points of the range were used (introducing some imprecision to the means).

Practice Expenses. Six measures of practice expenses are included on the combined database: nonphysician payroll, office, medical supplies, medical equipment, malpractice premiums (for all members), and an "other" category. Each of these measures is calculated on a per physician basis. Table 2-4 provides detailed question phrasing.

There are several differences in the nonphysician payroll expense variable between the two surveys. The least complicated is the SMS question, which simply asks for "total nonphysician payroll expenses, including fringe benefits." There are no probes or examples provided with the SMS question. The PPCIS asks for wages, deferred compensation, and fringe benefits separately -- probing for such expenses as profit sharing, 401-K plans, unemployment insurance, life and disability insurance, etc. The three components are summed together to arrive at total nonphysician expenses.

Because the SMS does not ask about deferred compensation at all and does not ask for fringe benefits separately, an additional measure of nonphysician payroll expense was defined for the PPCIS, excluding deferred compensation and fringe benefits.

The SMS gathers office expenses through a single question, compared with three questions in the PPCIS. The SMS asks for the physician's own share of the mortgage/lease/rent, office/building depreciation, and utilities (including telephone expenses). On the PPCIS, it is first determined whether the physician rents, owns, rents and owns, or neither. Physicians are then routed to the appropriate question: owners are asked

about depreciation/interest costs and renters are asked about rental/lease costs. Both are then asked about utility and telephone expenses. Physicians with no office expenses were asked to verify that they indeed had no expenses. The three office expense variables were summed to create a measure comparable to the SMS.

The questions about expenses for medical equipment, and medical materials and supplies are very similar, except that the SMS adds the wording "...and (expenses) for outside lab work and other services." at the end of the medical supplies question.

The SMS medical liability expense question asks physicians to report their share of medical malpractice insurance coverage premiums. The PPCIS asks for total medical liability expenses for the entire practice, with a probe asking for both physician and nonphysician expenses as well as amounts paid for both basic and excess coverage and contributions to state patient compensation funds. The SMS does not probe with any such detail.

The "other" category aggregates the residual expenses not elsewhere classified. The "other" category for the SMS includes "car upkeep, professional association memberships, professional journals" etc. Likewise, the PPCIS "other" category includes the remaining &-expense questions not classified elsewhere: physician employee wages, deferred compensation/bonuses and fringe benefits; automobile expenses; continuing education expenses; and miscellaneous expenses.

However, given the general nature of the SMS question, it is likely that physicians excluded (or at the very least underestimated) physician employee wages from the "other" category in the SMS (even though, technically, these expenses should be reported in the "all other expense" category). Thus, we defined two alternate definitions of the PPCIS "all other expense" category: one with physician employee wages and one without.

Physician Productivity. The combined database includes three measures of physician work effort: total hours, administrative hours, and patient care hours. The PPCIS asks for total hours and total administrative hours per week in addition to a patient care breakdown. Patient care hours are calculated as the residual of total hours minus administrative hours. The SMS asks for total hours plus a seven-part breakdown: six patient care categories and one

- administrative category. Total patient care hours are not asked; rather, they are calculated by summing across the six categories. Should one or more of the patient care components be missing, then the total patient care hours variable is set to missing.

Practice Size. For the PPCIS, the number of **full-time** equivalent (**FTE**) physicians is constructed by summing the number of **full-time** physicians formally associated with the practice (for at least 20 hours per week) and one-third of the number of **part-time** physicians formally associated with the practice (i.e., those that work less than 20 hours per week).^{*} The SMS asks physicians to report the number of FIE physicians (without any guidance on how to calculate full-time equivalents).

For the PPCIS, measures of **FTE** physicians are essential for the analysis of practice expense variables in order to express expense values on a “per-physician” basis. Because the SMS asks physicians to report their own share of expenses, such adjustments are not necessary. The variable provided on the SMS Public Use Tape does not exceed 10; practices with greater than 10 FTE physicians were truncated at 10. For comparability, the same truncation was applied to the PPCIS FTE variable.

A measure of **nonphysician** employees was also included in the combined database. Again, the SMS provides no guidance on the calculation of **FTEs**; additionally, the SMS Public Use Tape truncates the variable at 20; practices with greater than 20 nonphysician employees are recorded as 20. The PPCIS asked for total nonphysician employees (with no **FTE** adjustment), as well as a breakdown by type of employer. To achieve comparability with the SMS, all values above 20 were truncated at 20.

Physician Practice Characteristics. The PPCIS and the SMS rely on AMA Masterfile information to determine board certification status; neither survey attempted to verify board certification during the interview.

The PPCIS asked whether the group was multispecialty in 1988 (the reference year for the survey). A separate question asked how many physicians were of the same specialty as the respondent. The two questions (SCR7D and SIZ13) were combined to create a variable called MULTSPEC. A question on the SMS asked whether physicians practiced in a multispecialty group, without the emphasis on reference year (1988).

^{*}Each part-time physician is counted as one-third of an FTE, given that they work less than 20 hours per week.

The PPCIS and SMS asked similar questions about the percent of revenues from various sources, including Medicare, Medicaid, and private insurers. Responses were expected to sum to 100 percent, facilitated by CATI prompts for nonreconciled data.

**TABLE 2-1
SUMMARY OF SURVEY COMPARABILITY: PPCIS VS. SMS**

SURVEY CHARACTERISTICS	PPCIS	SMS
<u>Eligibility</u>		
Currently Provide Patient Care 20+ hours/week	Yes	Yes
Not Currently a Resident, Clinical Fellow, or Research Fellow	Yes	Yes
Not Employed by a Faculty Practice Plan, Hospital, Clinic or HMO. or Federal Government Agency in 1988	Yes	Must be non-federal
If in a Multipractice Arrangement, greater than 80 percent of income must be from the practice in which the physician was full or part owner, or employed by another physician or group of physicians	Yes	---
Have spent at least twenty hours per week in patient care (or services) during 1988	Yes	---
Have been in the same private practice for all of 1988	Yes	---
Not a Doctor of Osteopathy	Yes *	Yes
<u>Data Collection Procedures</u>		
Mode of Collection	50.5% Hardcopy 49.5% CATI	4.6% Hardcopy 95.4% CATI
Proportion of Mail Questionnaires	<1.0%	5.5%
Field Period	July 1989 – March 1990 (8.25 months)	March 1989 – August 1989 (5 months)
<u>Sample Methods</u>		
Sample Design	Stratified Random Sample	Simple Random Sample
Response Rate	61.0%	72.0%
Sample Size	3,505	3,448 . *
<u>Sample Weights</u>		
Unit Non-Response Correction	Yes	Yes
Over/Under Sampling Correction	Yes	N/A
Enable Projections to National Population	Yes	---

Sources: PPCIS: Thalji. et al. 1991; SMS: Socioeconomic Characteristics of Medical Practice. 1989.

* By default, the PPCIS excludes DOs because they were not selected from the sample frame.

** Original sample was 4,104; physicians employed by facilities other than another physician or group of physicians were deleted

TABLE 2-2
VARIABLES INCLUDED IN COMBINED DATABASE

<u>Generic Variable Label</u>	<u>PPCIS Public Use File Variables</u>	<u>SMS Public Use File Variables</u>
SAMPLE INFORMATION:		
ID Number	ID	IDOBS*
Weight	WTVAR	UNITWT
CHARACTERISTICS:		
Census Region	REGION	ZCENREG
Rural/Urban	SMSA	ZCNTYCD
Specialty	SPECIAL	SP13
Board Certification	BOARD1	CERT
Multispecialty Group	MULTSPEC	SAMESPEC
Employment Status	5A	EMPL
Percent Medicare Patients	38B	MEDICARE
PRODUCTIVITY:		
Total Hours per Week	9A	HTOT
Hours per week, Administrative	9B	HNPC
Hours per week, Patient Care	9A-9B	HPC
SIZE		
Total # of FTE MDs	SUM(12A,(12C/3))	DOCNUM
Total # of Non-MDs	14	NOPER
EXPENSES:		
Physician Net Income	NET	NETYEAR
Nonphysician Payroll Expense	SUM(18, 18A, 18B)	EXPPER
Office Expense	SUM(19A, 19B, 19D)	EXPOFF
Medical Liability Expense	23	EXPMAL
Medical Materials/Supplies Expense	22	EXPSUP
Medical Equipment Expense	21	EXPEQP
Other expenses N.E.C.	SUM(17, 17A, 17B, 24, 25, 26)	EXPOTH

Sources: 1988 PPCIS and 1989 Core SMS.

**TABLE 2-3
DEFINITIONS OF STRATA FOR COMBINED SAMPLE: PPCIS AND SMS**

<u>CUMULATED FILE STRATA</u>	<u>ORIGINAL PPCIS VARIABLE</u>	<u>ORIGINAL SMS VARIABLE</u>
<u>SPECIALTY</u>	<u>"SPECIAL"</u>	<u>"SP13"</u>
1. General/Family Practice	GP, FP	1
2. Internal Medicine	IM	2
3. Medical Subspecialties	A, AI, DLI , IG, DIA , END, GER , HEM, I, NTR ON, RHU, CCM, CD, GE, PUD, D, GPM, N	3
4. General Surgery	GS	4
5. Surgical Subspecialties	AS, CDS, HS, HNS, PDS, TRS, VS , OT , ORS, OPH, U, CRS, NS, PS , TS	5
6. Pediatrics	ADL, NPM, PD, PDA, PDE, PDP , PHO , CHN, PDC	6
7. Obstetrics/Gynecology	GYN, GO, MFM, OBS, OBG, REN	7
8. Radiology	NR, PDR, R , RO, NM, DR	8
9. Psychiatry	P, PYA, CHP	9
10. Anesthesiology	AN	10
11. Pathology	ATP, PTH, BLB, CLP, CMP, DMP, IP , RIP, FOP	11
12. Emergency Medicine	EM	12
13. Other	PA, LM, OS, US, AM, OM, PM, PH	13
<u>REGION</u>	<u>"REGION"</u>	<u>"ZCENREG"</u>
1. Northeast	1	1
2. North Central	2	2
3. South	3	3
4. West	4	4
<u>URBANICITY</u>	<u>"MSA"</u>	<u>"ZCNTYCD"</u>
0. Rural	0	0,1,2,3,4
1. Urban	1	5,6,7,8

Source: 1988 PPCIS and 1989 Core SMS.

TABLE 2-4
QUESTION BY QUESTION COMPARISONS; PPCIS VS. SMS

VARIABLE	PPCIS	SMS
NET INCOME		
NETINC	<p>NETINC = Q29A or midpoint of Q29B range</p> <p>Q29: In 1988, what was your own personal net income from all of your medical activities after practice deductions but before taxes, to the nearest thousand? Please include salaries, not profit, fringe benefits, bonuses, deferred income, and other forms of compensation.</p> <p>(PROBE: Please remember that the confidentiality of all information provided is strictly protected. All identifying information is destroyed and responses are presented only in summary statistical form.)</p> <p>Q29A: ENTER EXACT AMOUNT IF GIVEN</p> <p>Q29B: IF NOT, We just need a range. Was it above or below....</p>	<p>NETINC = QD6</p> <p>QD6: During 1988, what was your own net income from medical practice, to the nearest \$1000, after expenses but before taxes? Please include all income from fees, salaries, retainers, and other forms of compensation.</p>
EXPENSES		
EXPPER	<p>Now I would like to ask you about [(your/your group's)/Dr. ____'s (group's)] expenses in 1988. Enclosed with the letter we sent you was a green worksheet listing several expense categories. Do you have that sheet handy?</p> <p>EXPPER = SUM(18, 18A, 18B)/FTEMD</p> <p>Next we will ask you about your non-physician employees.</p> <p>18: You told us [(you/your group)/Dr. ____/Dr. ____'s group) employed [NUMBER IN Q 14] non-physician staff. In 1988, what were the total actual gross wages for all non-physician employees? Do not include deferred compensation and bonuses.</p>	<p>IF YOU ARE A SOLO PRACTITIONER: To the nearest \$1000, record the tax-deductible expenses you incurred for each of the following medical expense items and total expenses for 1988.</p> <p>IF YOU ARE A PARTNER OR OWNER OF A GROUP PRACTICE: To the nearest \$1,000, record your share of your main practice's professional expenses, as well as any other professional expenses that were not related to your main practice, for each of the following medical expense items and total expenses for 1988.</p> <p>IF YOU ARE AN EMPLOYEE OF A HOSPITAL, MEDICAL FACILITY, OR OTHER MEDICAL PRACTICE: Skip this question and go to D.5. next page.</p> <p>The next question concerns your professional expenses for 1988</p> <p>EXPPER = QD2C</p> <p>QD2C: Total non-physician payroll expenses, including fringe benefits.</p>

18A: In 1988, how much was spent for deferred compensation and bonuses for these employees? (PROBE: Include pension and profit sharing, such as IRA's and 401-K plans.)

186: In 1988, how much was spent for fringe benefits for [you/your group's/Dr._____'s (group's)] non-physician employees, including social security and health, life and disability insurance. (PROBE: Also include unemployment and workmen's compensation.)

EXPOFF

EXPOFF = SUM(Q19A,Q19B,Q19D)/FTEMD

EXPOFF = QD2B

Q19A: What was the yearly rental or lease cost for this office space?

QD2B: Office expenses, including rent or mortgage for office space, building depreciation on medical buildings used in your practice, utilities and telephone.

Q19B: In 1988, how much was [(your/your group's)/(Dr._____'s/ Dr.'s group's)] yearly depreciation and interest cost for office space, that is, how much did you write-off for tax purposes in 1988?

Q19D: What were [(your/your group's)/(Dr._____'s/Dr._____'s group's)] expenses for (utilities/telephone/utilities and telephone) in 1988?

EXPSUP

EXPSUP = Q22/FTEMD

EXPSUP = QD2D

Q22: In 1988, what were [(your/your group's)/(Dr._____'s/Dr._____'s group's)] annual expenses for all medical materials and supplies, including drugs, biological% X-ray films, and outside lab fees? Do not include office supplies.

QD2D: Medical materials and supplies, such as drugs, X-ray films and expenses for outside lab work and other services.

EXPMAL

EXPMAL = Q23/FTEMD

EXPMAL = QD2A

Q23: In 1988, how much did [you/your (Dr.up)/(Dr.'s group)] pay for malpractice insurance premiums for all members of your practice? (PROBE: Include both physicians and non-physicians. Please include amounts paid for both basic and excess coverage, as well as contributions to state patient compensation funds.)

QD2A: Professional medical liability, or malpractice, insurance premiums

EXPEQP

EXPEQP = Q21/FTEMD

EXPEQP = QD2E

Q21: In 1988, what were [(your/your group's)/Dr._____'s/Dr._____'s group's)] yearly depreciation, interest, lease, and rental expenses for medical equipment. Do not include the total purchase price or the replacement value of your medical equipment. Please report only that portion that was tax-deductible in 1988.

QD2E: Depreciation, leases and rent on medical equipment. Do not include the total purchase price or the replacement value of your medical equipment. Please report only that portion which was tax-deductible in 1988.

VARIABLE

PPCIS

SMS

EXPOTH

EXPOTH = SUM(Q17,Q17A,Q17B,Q24,Q25,Q26)/FTEMD

EXPOTH = QD2F

The second expense category is compensation for physician employees only, that is, physicians who are not partners, owners, or shareholders.

QD2F: All other expenses including professional car upkeep and depreciation, professional association memberships, professional journals, continuing education and other expenses that have not been listed.

17: In 1988, what were the total actual gross wages for all of the physician employees in [(your practice/your group)/Dr. _____'s (practice/group)]? Please include wages for both full- and part-time staff. Do not include deferred compensation and bonuses. (PROBE: Exclude partners and owners).

17A: In 1988, how much was spent for deferred compensation and bonuses for all physician employee(s)? (PROBE: Include pension and profit sharing, such as IRA's and 401-K plans.)

178: In 1988, how much was spent for fringe benefits for physician employee(s), including social security and health, life and disability insurance. (PROBE: Also include unemployment and workmen's compensation.)

24: In 1988, how much did [you/your group]/Dr. _____/Dr. _____'s group] spend for professional automobile upkeep and depreciation? Please include only the expenses that were tax deductible in 1988.

25: In 1988, how much did (you/your group)/Dr./Dr. _____'s group] spend for continuing education (for physicians)? Include non-physicians.

26: Finally, how much was spent for miscellaneous items not reported elsewhere, such as legal expenses, accounting services, office management services, property taxes and building insurance? Do not include income taxes. [PROBE: Include office supplies and cleaning service.]

EXPTOT

EXPTOT = (EXPPER+EXPOFF+EXPSUP+EXPMAL+EXPEQP+EXPOTH)

EXPTOT = (EXPPER+EXPOFF+EXPSUP+EXPMAL+EXPEQP+EXPOTH)

WORK EFFORT

Now think about your work schedule during your most recent full week of practice, that is, the 7 days from Monday through Sunday.

The next few questions are about the number of hours you spent working at several medical and administrative activities during your most recent complete week of practice. By "complete week of practice" we mean the most recent week in which you worked your normal work schedule. We want to exclude weeks with holidays or weeks when you were sick or on vacation.

VARIABLE

PPCIS

SMS

HRSTOT

HRSTOT = Q9A

HRSTOT = HRSPC + HRSAD

Q9A: How many hours total did you work during that week? Please include all administrative and medical activities, except "on call" hours not actually worked and travel time.

HRSPC

HRSPC = Q9A - Q9B

HRSPC = SUM (QB1 + QB2 + QB3 + QB4 + QB5 + QB6)

QB1: During that week, how many hours did you spend in the office or in freestanding primary or urgent care centers seeing patients?

QB2: During that week, how many hours did you spend in outpatient clinics or in hospital emergency rooms?

QB3: During that week, how many hours did you spend on house calls and with patients in nursing homes, convalescent homes, or other extended care facilities?

QB4: During that week, how many hours did you spend in the operating, labor or delivery room, including waiting time before surgery?

QB5: During that week, how many hours did you spend making hospital rounds, including visits to newborn infants, but excluding hours spent on call when you were not actually working?

QB6: During that week, how many hours did you spend having telephone conversations with patients or their families, consulting with other physicians and providing other services to patients such as interpreting lab tests and X-rays?

HRSAD

HRSAD = Q9B

HRSAD = QB7

Q9B: Altogether, during those 7 days, how many hours did you yourself spend at administrative activities connected with your practice?

(PROBE: Include such things as filling out insurance forms and medical records, billing patients, dealing with personnel or financial matters of the practice, research, and conferences.)

PATHOLOGISTS ONLY: Please do not include the time you spent performing autopsies.

QB7: During that week, how many hours did you spend in administrative activities connected with your practice and other medical facilities, as well as any other professional activities that did not involve patient care? These activities include managing your practice, medical staff functions, supervising residents and interns, teaching, lecturing, professional reading, writing and research.

PRACTICE SIZE

FTEMED

FTEMED = Q12A + .33(Q12C)

(Recoded to match lo-category variable on SMS file.)

The next questions are about the staff in your practice.

Q12A: As of December 31, 1988, how many physicians were formally associated with your practice for at least 20 hours a week? Please include yourself, all full or part-owners, and physicians who were employed by your practice.

Q12C: As of December 31, 1988, how many other physicians were formally associated with your practice for less than 20 hours a week?

FTEMED = Q6

Q6: Including you, how many full-time equivalent physicians are in the main practice?

Note: The Public Use File sets Q6=10 for practice8 with 10 or more physicians.

NONMDEMP

NONMDEMP = Q14

Q14: As of December 31, 1988, how many non-physician employees were there in your (practice/group)? Please include both administrative and patient-care staff.

NONMDEMP = QA8

QA8: Altogether, how many non-physician personnel are employed in the practice on a full-time equivalent basis?

Note: The Public Use File sets QA* = 20 for practices with 20 or more non-physician employees.

MEDICARE

PERMED

PERMED = Q38B

The next few questions are about health insurance. Please tell us about revenue according to the primary payer, whether or not you collect directly from the payer [PROBE: For (your/Dr. ____'s patients)]

In 1988, about what percentage of (your/Dr. _____'s) revenues were from...

Q38A: Uninsured patients, that is, who have no private or government insurance coverage at all for physicians' services?

Q38B: Part B of Medicare as a primary payer?

Q38C: The state Medicaid program as a primary payer?

Q38D: Private Blue Shield insurance as a primary payer?

Q38E: Other private health insurance plans as primary payers?

Q38F: Or some other source? (SPECIFY)

NOTE: The components were reconciled to sum to 100%.

PERMED = QE1

Please estimate the percentage of your revenues that were received from each of the following third party payors, whether or not your practice bills those payors directly. In the last category, record the percentage of your revenues that are received from payment8 that are not reimbursed by any third party plan.

QE1. Reimbursed by Medicare

QE2. Reimbursed by Medicaid or MediCal

QE3. Reimbursed by Blue Cross or Blue Shield

QE4. Reimbursed by other private or commercial plans

QE5. Patient payments not reimbursed by any third party plan

NOTE: The component8 were reconciled to sum to 100%.

3.0 COMPARABILITY OF PPCIS AND SMS DATA

Prior to understanding the sample cumulation it is important to assess whether the two surveys are comparable data. If so, they are suitable for combination. If not, caution must be exercised in combining the two samples. This chapter compares the data reported in the two surveys along several dimensions: the magnitude of item nonresponse, comparability of means for selected analytic variables to be included in the combined database, and similarities of the distributions (reflected by percentiles).

3.1 Item Nonresponse

Item nonresponse rates give some indication of the difficulty physicians had in responding to individual questions. Additionally, nonresponse rates give some indication of the extent to which a selection bias may be introduced; the lower the level of response, the greater concern that responding physicians may differ systematically from nonresponding physicians.

Table 3-1 shows item nonresponse rates (adjusted for valid skips) for the PPCIS, SMS, and combined databases for the selected analytic variables. Appendix A contains detailed data on the sources of item nonresponse for the source variables used to construct the analytic variables. Table A-1 displays the results for the PPCIS and Table A-2 for the SMS.

For practice expense questions, the SMS has nonresponse rates ranging from a low of 21.8 percent (medical liability expense) to a high of 38.3 percent (medical equipment expense). In contrast, the PPCIS nonresponse rates for practice expense questions range from a low of less than 1 percent (office expense and “other” expenses) to a high of 12.3 percent (medical equipment expenses). Overall, the non-response rate for total expenses was 42.7 percent in the SMS versus 16.8 percent in the PPCIS.

The SMS also has a higher nonresponse rate for the question asking about physicians’ percent of revenues from Medicare. The PPCIS nonresponse rate was 4.4 percent, while the SMS rate was 16.9 percent. At other questions, such as hours per week (total, administrative, and patient care) and practice size, both surveys had similarly low nonresponse rates.

That an average of one-third of physicians did not respond to the SMS expense questions raises concerns of selection bias. Additional analysis is required to ascertain whether physicians that responded are different from those that did not respond.

3.2 Comparability of Means for Selected Variables

Table 3-2 shows the means and medians for the variables included in the combined database. T-tests were performed to test the statistical significance of the observed differences.*

Mean expenses for medical equipment, malpractice premiums, medical supplies, and total expenses are not significantly different between the two surveys. Likewise, annual net income from medical practice is similar for the two surveys. The number of full-time equivalent physicians associated with the practice was also very similar-- 3.23 for the PPCIS versus 3.19 for the SMS.**

Several variables, however, showed statistically significant differences; including aide expenses, office expenses, "other" expenses, hours per week (total, patient care, and administrative), number of nonphysician employees, and percent of revenues from Medicare patients. Each of these variables had differences that were significant at the 0.01 level or better.

The most striking difference is that of office expenses. Mean per-physician office expenses were \$21,637 on the PPCIS, compared to \$34,046 on the SMS, a 57 percent difference. One important difference is that the SMS asks for "Office expenses, including rent or mortgage..." It is likely that the probe for mortgage expenses is causing physicians to report actual mortgage payments rather than annual tax deductible mortgage expenses. Another possible explanation for this difference is that the PPCIS routes respondents according to whether they rent or own. In addition, the PPCIS verifies that utilities and/or telephone were included. It is possible that this routing helps increase accuracy by reducing the number of responses that are lump-sum "ballpark" estimates.

*Means are weighted (using original survey weights) and standard errors have been calculated with SUDAAN software to adjust for the complex sample design.

**This mean understates the number of FTE physicians per practice because of the cap imposed by the SMS for confidentiality.

For nonphysician employee expenses, the PPCIS mean was \$54,336, compared to \$48,441 for the SMS (a difference of 12 percent). The PPCIS variable is calculated by summing wages, deferred compensation, and fringe benefits for nonphysician employees. The comparable SMS question does not ask for separate components; therefore, it is likely that there is underreporting of deferred compensation and fringe benefits. In fact, the SMS question probes only for fringe benefits, not even mentioning deferred compensation.

In an attempt to correct for this apparent difference, we created an alternative definition of nonphysician employee expenses by excluding fringe benefits and deferred compensation. The mean of the alternative PPCIS variable was \$47,220-- not statistically different from the SMS mean.

Other expenses (not elsewhere classified) differed significantly between the two surveys. Physicians on the SMS reported mean other expenses of \$17,075, compared to \$27,055 on the PPCIS, a difference of 58 percent. Excluding physician employee wages from the PPCIS other category lowers the mean to \$22,140, however it remained significantly larger (by 30 percent) than the SMS mean other expenses. This remaining difference may still be a function of more detailed questions for the other expenses, with separate items for automobile, continuing education, and miscellaneous expenses.

One generic explanation for differences in practice expenses is that per-physician shares are obtained differently in the two surveys. The PPCIS asked physicians to report expenses for the entire practice. To calculate per-physician shares, practice-level expenses were divided by the number of full-time equivalent physicians. In contrast, the SMS asked physicians to report (estimate) their own share of expenses. The effect of this methodological difference is unknown. In some cases, physicians may find it difficult to report practice level data, while in other cases physicians may not be able to accurately report their share of expenses. To further investigate this difference, we compared the means for solo practitioners in the two surveys (presumably physicians in solo practice would not have been affected by the difference in share calculations). The results of this adjustment showed that means for solo physicians differed between the two surveys in the same manner as those for all physicians (Table 3-3).

Though the means appear to be very similar, significant differences persist across measures of productivity. The PPCIS reports higher administrative hours while the SMS reports higher patient care hours. Because the bulk of most physicians' hours are spent caring for patients, total hours worked per week is also higher for the SMS.

The SMS defines patient care hours by adding together the hours per week reported for several patient care activities. In contrast, the PPCIS calculates patient care hours by subtracting administrative hours from total hours. Thus, we defined two additional measures of hours per week: (1) adding together the individual patient care components on the PPCIS; and (2) changing the SMS definition of patient care hours to (HRSTOT - HRSAD). However, the differences were still significant (data not shown).

The mean number of nonphysician employees reported in the PPCIS was 7.12 compared to 6.38 for the SMS. The PPCIS asks for the total number of nonphysician employees, without adjusting for full-time **equivalence**. In contrast, the SMS asks for the number of **FTE** nonphysician employees (although no guidelines for calculating **FTEs** are provided). Additionally, the PPCIS asks for a disaggregation of employee counts by type and then reconciles the total against the sum of the individual components. The SMS only asks for the total and has no way of verifying responses to this question.

Surprisingly, the two surveys report significantly different mean percentages of revenue from Medicare. The PPCIS mean is 30.17 percent, compared to 27.99 percent for the SMS. One possible explanation for this difference is that physicians with higher proportions of Medicare patients are perhaps more likely to respond to a survey sponsored by HCFA, thus introducing some degree of selection bias (in the form of higher unit response) for those practices that rely more heavily on Medicare. The SMS, which is sponsored by the AMA, would not be expected to have such a bias.

3.3 Comparability of Percentile Distributions

In addition to comparing means, we examined the percentile distributions of the analytic variables. If two means are different, it is important to determine whether that difference is normally distributed. For example, are the higher mean office expenses reported on the SMS high because 5 percent or 1 percent of the SMS cases are reporting extremely high

levels, or are many cases reporting somewhat higher levels? Percentile distributions for the analytic variables are graphically displayed in Figures 3-1 through 3-14.

Annual net income from medical practice is distributed fairly similarly beneath the 90th percentile (Figure 3-1). Above the 90th percentile, however, the PPCIS is progressively higher. At the 99th percentile, the PPCIS is over \$100,000 higher, implying that the PPCIS has more high-income physicians than the SMS. (However, mean net incomes did not differ significantly because of a higher relative standard error in the PPCIS.)

For nonphysician employee expenses (Figure 3-2), the distributions are similar through the 90th percentile. The SMS is higher than the PPCIS at the 95th percentile, while the opposite occurs at the 99th percentile. Excluding fringe benefits and deferred compensation from the PPCIS nonphysician expense variable changes the distribution (Figure 3-2A). Above the 75th percentile, the SMS is consistently higher.

The percentile levels are dramatically different for office expenses (Figure 3-3). Throughout, the SMS levels are higher, particularly above the 75th percentile. At the 90th, 95th, and 99th percentile, the SMS levels are more than twice the PPCIS levels. This distributional difference above the median accounts for the SMS's significantly higher mean. Outlier responses in the SMS may indeed reflect the reporting of actual mortgages as opposed to tax deductible office expenses (such as depreciation and interest).

The distributions for malpractice expenses are similar (Figure 3-4), supporting the earlier finding of similar means. However, the distributions for medical equipment are different (despite comparable means) (Figure 3-5). The top 50 percent of cases on the SMS had medical equipment expenses higher than those of the PPCIS (possibly reflecting purchase prices rather than tax deductible expenses for the year). The distribution for medical supply expenses was most different at the 99th percentile, where the PPCIS was higher (Figure 3-6).

The PPCIS had higher "other" expenses throughout (Figure 3-7); however, after excluding physician employee wages from the PPCIS the distributions are more alike (Figure 3-7A). At the 99th percentile, the SMS is the higher of the two. All expenses added together are higher for the PPCIS below the median and higher for the SMS above the median (Figure 3-8). The means were not significantly different, however.

The SMS appears to have more physicians that work long weeks, explaining the higher means. Above the median, the SMS is consistently higher (Figure 3-9). Distributions for the two components that make up total hours per week (patient care and administrative) differ between the surveys. For patient care hours, the lower half of the cases on both surveys are distributed evenly; however, the upper half is greater for the SMS (Figure 3-10). Above the median, the PPCIS reports higher administrative hours per week (Figure 3-3 1). Finally, throughout the distribution, PPCIS cases report a greater share of revenues from Medicare (Figure 3-14).

**TABLE 3-1
NONRESPONSE RATES FOR COMBINED DATABASE VARIABLES:
PPCIS, SMS, AND COMBINED DATASET**

<u>GENERIC VARIABLE LABEL</u>	<u>VARIABLE</u>	<u>SURVEY</u>		
		<u>PPCIS</u>	<u>SMS</u>	<u>COMBINED</u>
Net Income	NETINC	8.2%	24.2%	16.1%
Nonphysician Payroll Expense	EXPPER	4.4%	34.9%	19.1%
Building Expense	EXPOFF	0.7%	33.9%	16.7%
Medical Liability Expense	EXPMAL	1.9%	21.8%	12.4%
Medical Materials/Supplies	EXPSUP	6.7%	36.8%	25.5%
Dep./lease/rent Med. Equipment	EXPEQP	12.3%	38.3%	29.9%
Other expenses N.E.C.	EXPOTH	0.1%	37.4%	29.0%
Total Expenses	EXPTOT	16.8%	42.7%	29.3%
Total hours per week	HRSTOT	0.1%	0.0%	0.1%
Hours per week, Administrative	HRSAD	0.0%	1.4%	0.7%
Hours per week, Patient care	HRSPC	0.0%	0.0%	0.0%
Total # of FTE MDs	FTEMD	0.0%	0.3%	0.1%
Total Non-MD FTEs	NONMDEMP	0.7%	2.5%	1.6%
Percent Medicare Patients	PERMED	4.4%	13.8%	8.8%
Specialty	SP13	0.0%	0.0%	0.0%
Board Certification	CERT	0.0%	0.0%	0.0%
Multispecialty Group	SAMESPEC	0.0%	0.1%	0.0%
Employment Status	EMPL	0.0%	0.0%	0.0%

~~1989~~ PPCIS and 1989 Core SMS.

**TABLE 3-2
COMPARISON OF MEDIANS, MEANS, AND STANDARD ERRORS: PPCIS AND SMS**

VARIABLE	DESCRIPTION	PPCIS				SMS				T-TEST FOR DIFFERENCES IN MEANS
		N	MEDIAN	MEAN	STANDARD ERROR	N	MEDIAN	MEAN	STANDARD ERROR	
NETINC	Annual Net Income	3,218	\$130,000	\$163,209	\$8,451	2,597	\$125,000	\$153,724	\$2,076	1.09
EXPPER	Aide Expenses	2,944	\$42,708	\$54,336	\$1,786	1,858	\$35,000	\$48,441	\$1,252	2.70 . **
EXPERX	Aide expenses (less deferred comp and fringe)	2,934	\$38,000	\$47,220	\$1,508	1,858	\$35,000	\$48,441	\$1,252	-0.62
EXPOFF	Office Expenses	3,056	\$15,980	\$21,637	\$688	1,887	\$21,000	\$34,046	\$957	-10.53 ***
EXPMAL	Malpractice Expenses	3,020	\$10,500	\$15,291	\$302	2,690	\$10,000	\$15,490	\$319	-0.45
EXPSUP	Medical Supply Expenses	2,874	\$6,000	\$17,318	\$3,045	1,805	\$7,000	\$14,498	\$566	0.91
EXPEQP	Medical Equipment Expenses	2,700	\$1,390	\$6,446	\$526	1,762	\$2,000	\$6,866	\$351	-0.66
EXPOTH	Other Expenses	3,075	\$15,500	\$27,055	\$768	1,787	\$8,000	\$17,075	\$766	9.20 . **
EXPOTHX	Other Expenses (less MD-employee wage)	3,016	\$13,667	\$22,140	\$1,508	1,787	\$8,000	\$17,075	\$766	2.99 . **
EXPTOT	Total Expenses	2,562	\$113,548	\$143,358	\$5,282	1,635	\$109,000	\$135,360	\$2,866	1.33
HRSTOT	Hours per Week- Total	3,501	60.00	58.03	0.29	3,336	58.00	59.93	0.31	-4.47 ***
HRSPC	Hours per Week- Patient care	3,497	52.00	52.29	0.28	3,344	54.00	54.93	0.30	-6.47 . **
HRSAD	Hours per Week- Administrative	3,500	4.00	5.74	0.11	3,401	4.00	5.06	0.10	4.63 ***
FTEMD	# FTE physicians	3,504	2.00	3.23	0.05	3,188	2.00	3.19	0.05	0.59
NONMDEMP	# FTE Non-physicians	3,480	4.00	7.12	0.12	3,115	4.00	6.38	0.12	4.40 . **
PERMED	Percent revenues Medicare	3,352	30.00	30.17	0.35	2,740	25.00	27.99	0.38	4.25 . **

Notes: Expenses are calculated on a per physician basis.
Standard errors are corrected using SUDAAN; original survey weights have been applied.

- = significant at .10 or better
- ** = significant at .05 or better
- *** = significant at .01 or better

Sources: 1988 PPCIS and 1989 Core SMS

**TABLE 3-3
COMPARISON OF MEDIANS, MEANS, AND STANDARD ERRORS: PPCIS AND SMS (SOLO PRACTICES ONLY)**

VARIABLE	DESCRIPTION	PPCIS				SMS				T-TEST FOR DIFFERENCES IN MEANS
		N	MEDIAN	MEAN	STANDARD ERROR	N	MEDIAN	MEAN	STANDARD ERROR	
NETINC	Annual Net Income	1,574	\$120,000	\$136,838	\$2,820	1,081	\$118,000	\$140,506	\$3,094	-0.88
EXPPER	Aide Expenses	1,592	\$36,000	\$48,123	\$2,979	1,058	\$30,000	\$40,232	\$1,407	2.40 *
EXPERX	Aide expenses (less deferred comp and fringe)	1,586	\$32,000	\$42,519	\$2,505	1,476	\$30,000	\$40,232	\$1,407	0.80
EXPOFF	Office Expenses	1,655	\$16,800	\$23,342	\$1,147	1,066	\$20,000	\$31,981	\$1,097	-5.44 **
EXPMAL	Malpractice Expenses	1,636	\$10,000	\$15,149	\$438	1,193	\$8,000	\$14,275	\$482	1.34
EXPSUP	Medical Supply Expenses	1,545	\$5,000	\$14,952	\$1,580	1,011	\$6,000	\$12,792	\$603	1.28
EXPEQP	Medical Equipment Expenses	1,455	\$840	\$6,426	\$832	990	\$2,000	\$5,733	\$384	0.76
EXPOTH	Other Expenses	1,668	\$13,000	\$20,299	\$747	1,005	\$8,000	\$14,711	\$843	4.96 **
EXPOTHX	Other Expenses (less MD-employee wage)	1,631	\$13,500	\$20,641	\$752	1,476	\$8,000	\$14,711	\$843	5.25 ***
EXPTOT	Total Expenses	1,383	\$98,000	\$129,261	\$7,012	934	\$95,000	\$117,193	\$3,152	1.57
HRSTOT	Hours per Week- Total	1,664	60.00	57.38	0.43	1,446	58.00	59.03	0.49	-2.55 *
HRSPC	Hours per Week- Patient care	1,682	50.00	51.05	0.40	1,450	52.00	53.73	0.46	-4.35 **
HRSAD	Hours per Week- Administrative	1,685	5.00	6.33	0.16	1,458	4.00	5.32	0.14	4.73 **
NONMDEMP	# FTE Non-physicians	1,679	3.00	2.95	0.06	1,474	2.00	2.50	0.06	5.56 **
PERMED	Percent revenues Medicare	1,615	30.00	31.03	0.53	1,307	25.00	28.01	0.57	3.87 **

Notes: Expenses are calculated on a per physician basis.
Standard errors are corrected using SUDAAN; original survey weights have been applied.

* = significant at .10 or better

** = significant at .05 or better

*** = significant at .01 or better

Sources: 1988 PPCIS and 1989 Core SMS

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Figure 3-1
DISTRIBUTION OF ANNUAL NET INCOME:
SMS VS. PPCIS

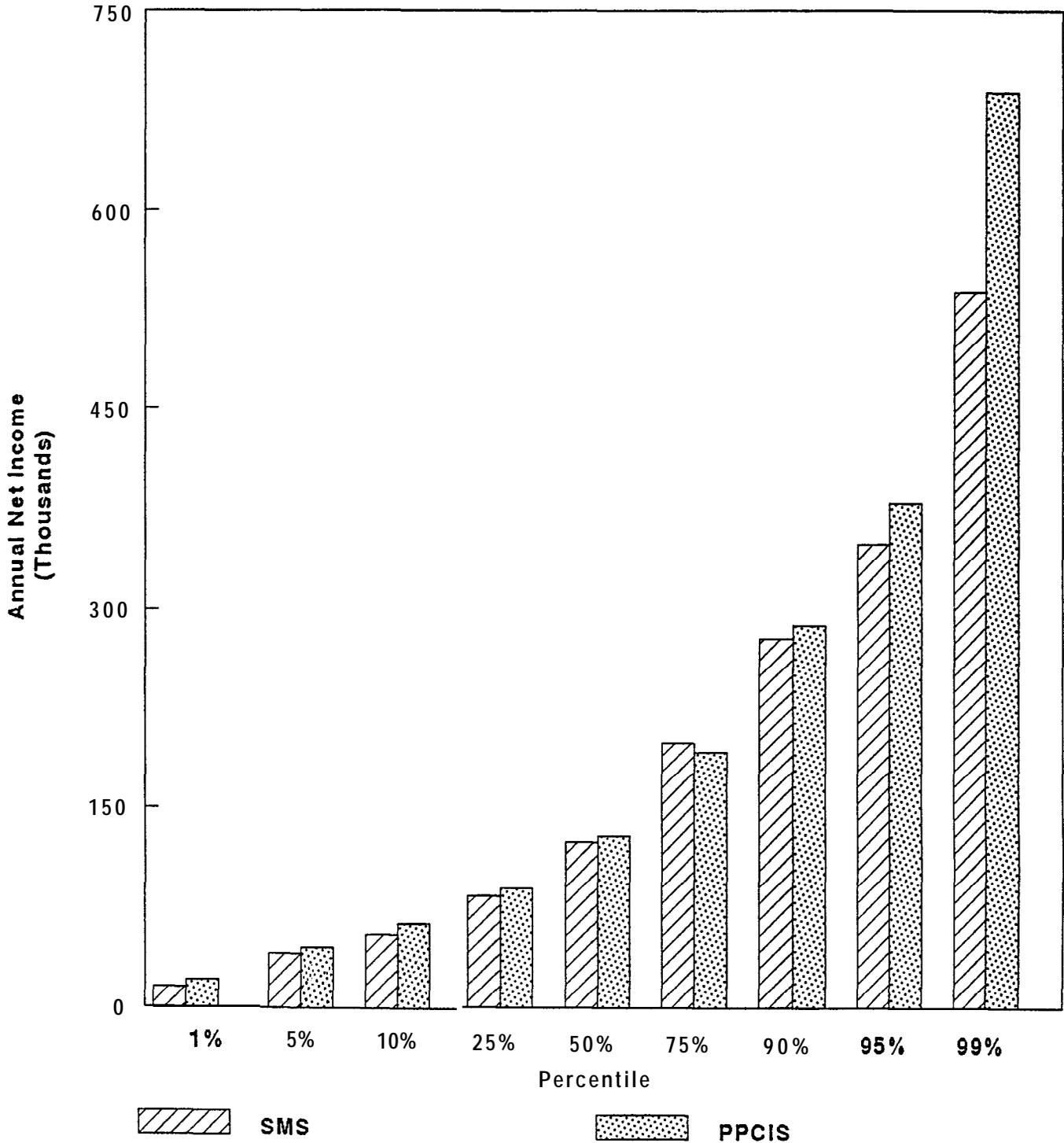


Figure 3-2
DISTRIBUTION OF NON-MD AIDE EXPENSE PER MD:
SMS VS. PPCIS

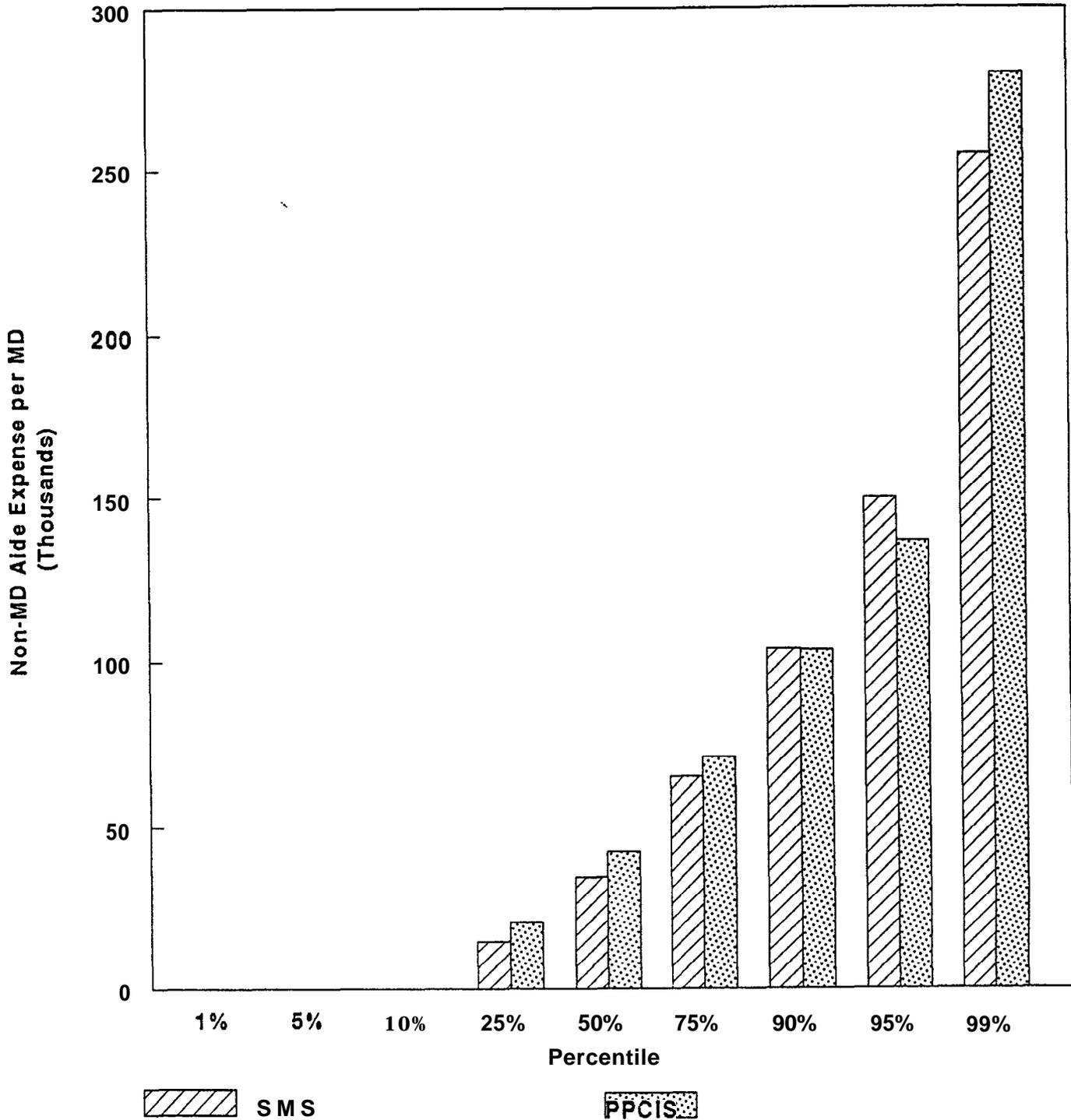
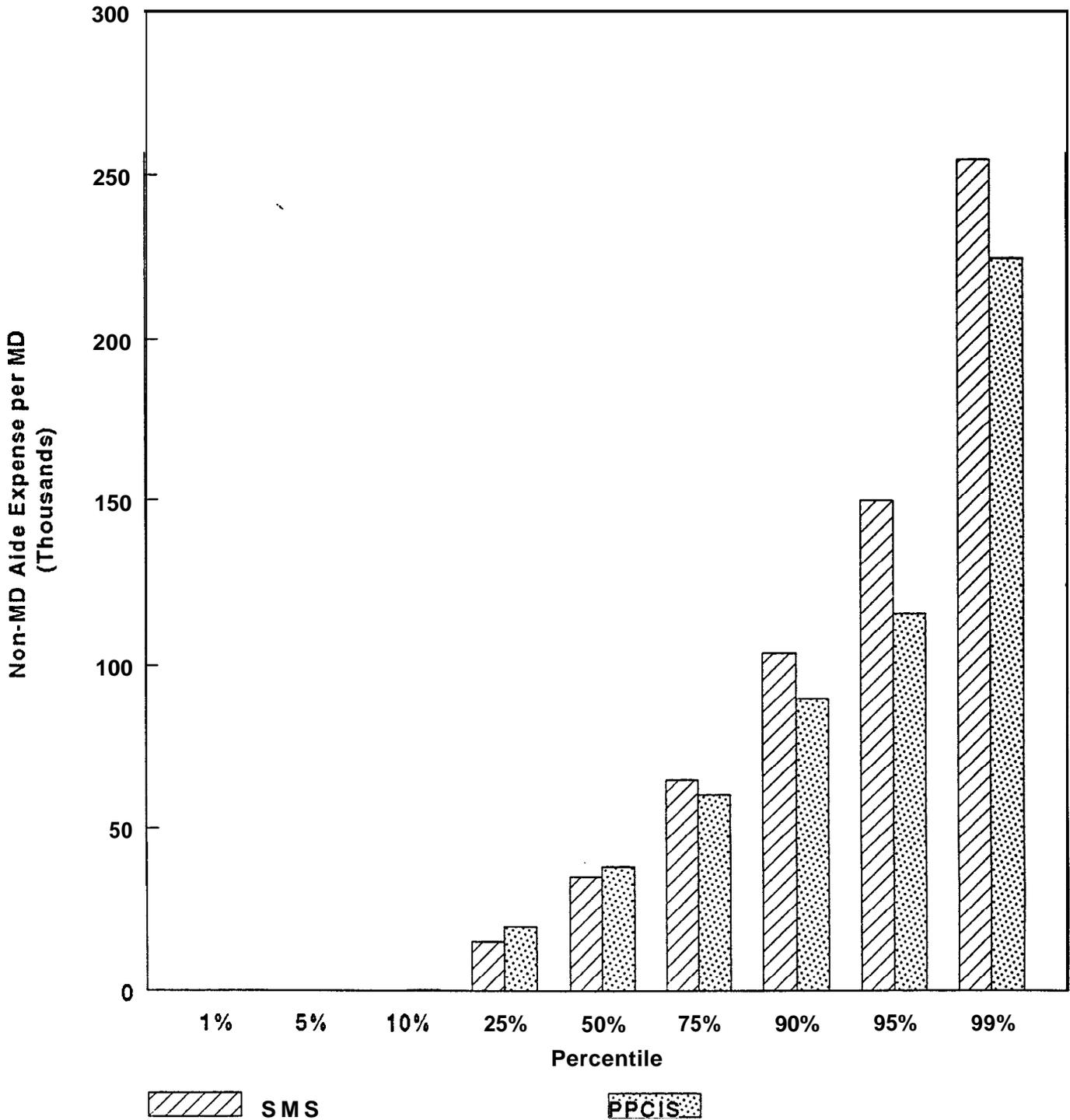


Figure 3-2A
DISTRIBUTION OF NON-MD AIDE EXPENSE PER MD:
SMS VS. PPCIS**



(*) Excludes Fringe Benefits and Deferred Compensation from PPCIS.

Figure 3-3
DISTRIBUTION OF OFFICE EXPENSE PER MD:
SMS VS. PPCIS

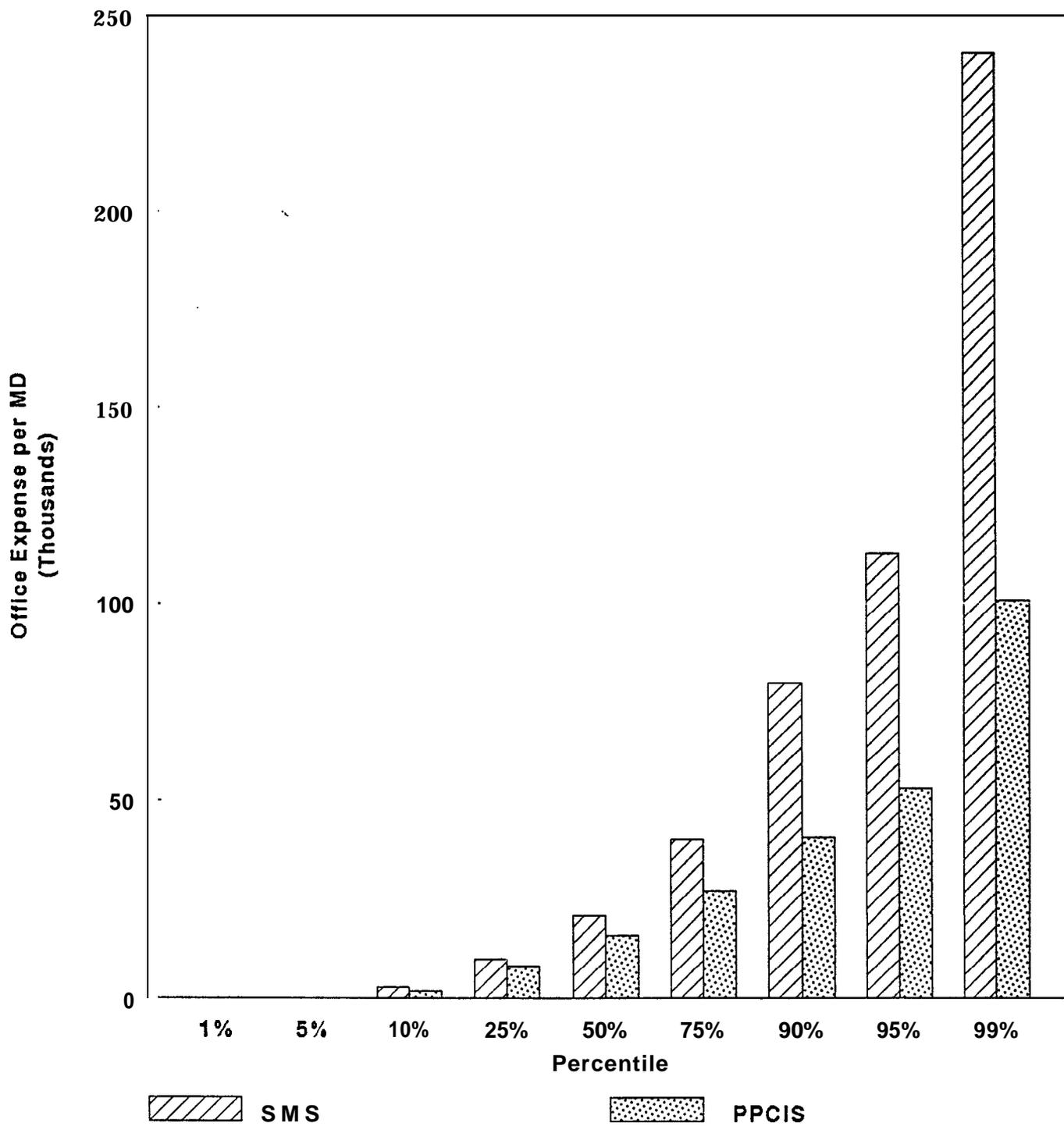


Figure 3-4
DISTRIBUTION OF MALPRACTICE EXPENSE PER MD:
SMS VS. PPCIS

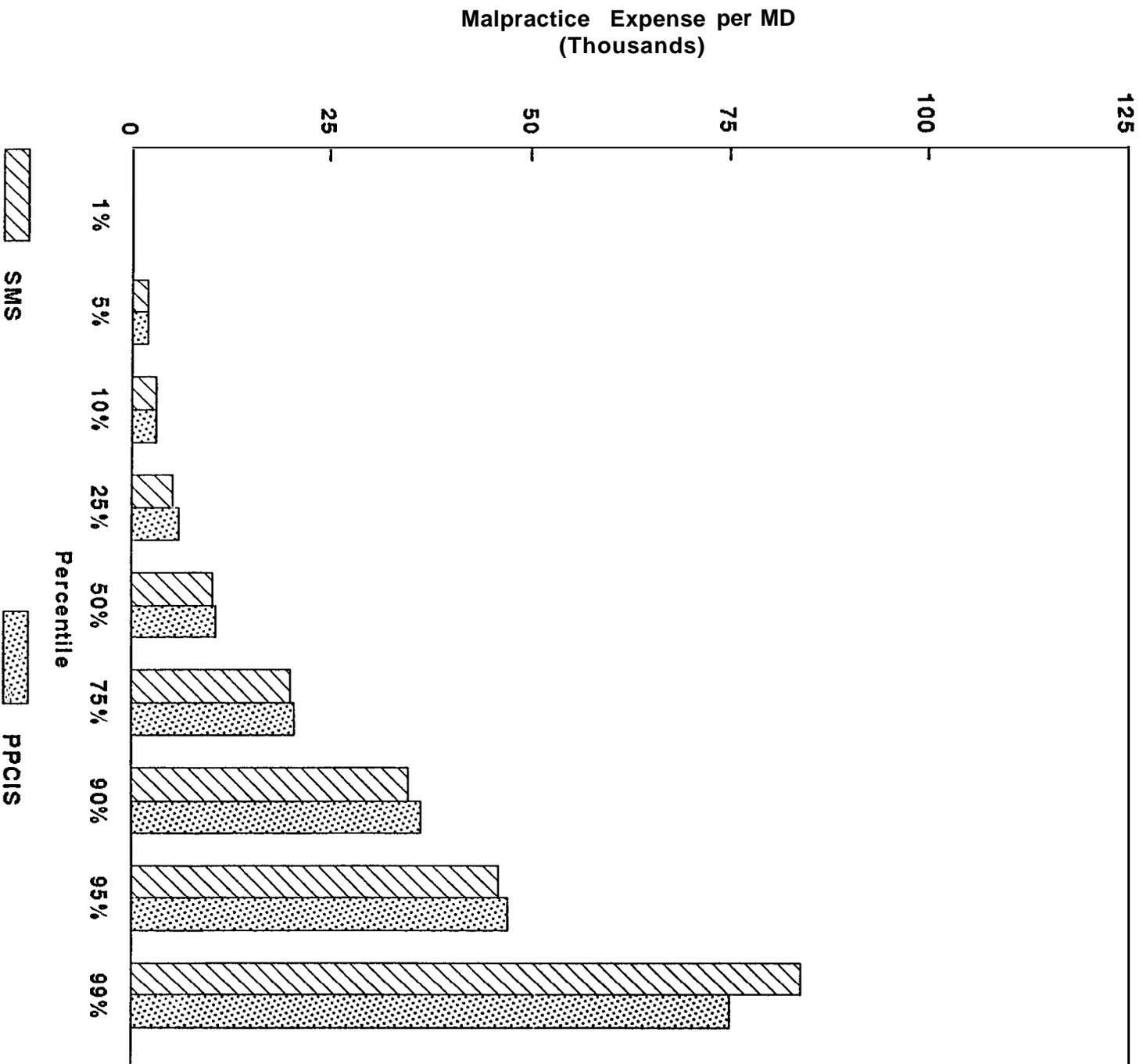


Figure 3-5
 DISTRIBUTION OF MEDICAL EQUIPMENT EXPENSE PER MD:
 SMS VS. PPCIS

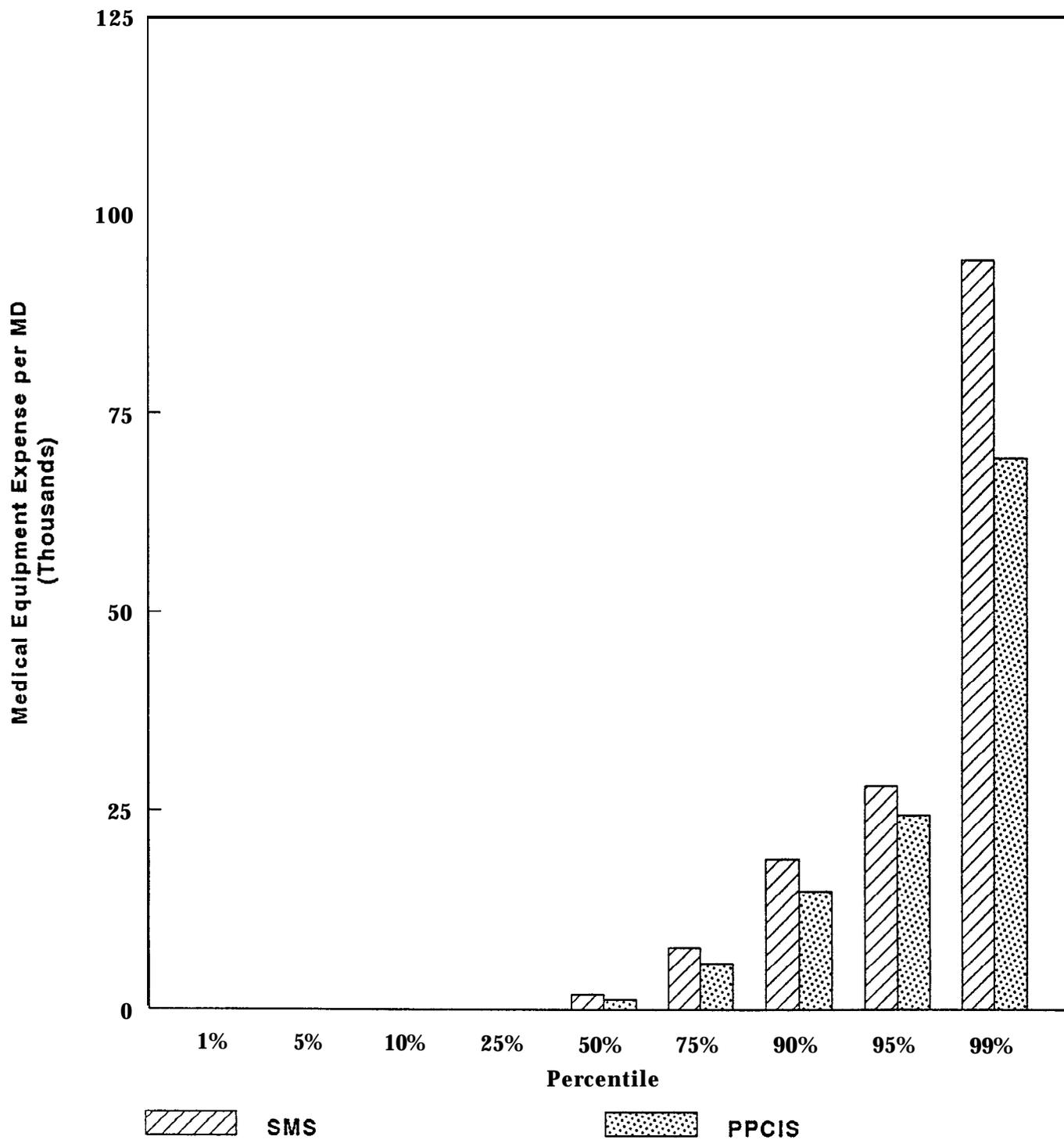


Figure 3-6
DISTRIBUTION OF MEDICAL SUPPLY EXPENSE PER MD:
SMS VS. PPCIS

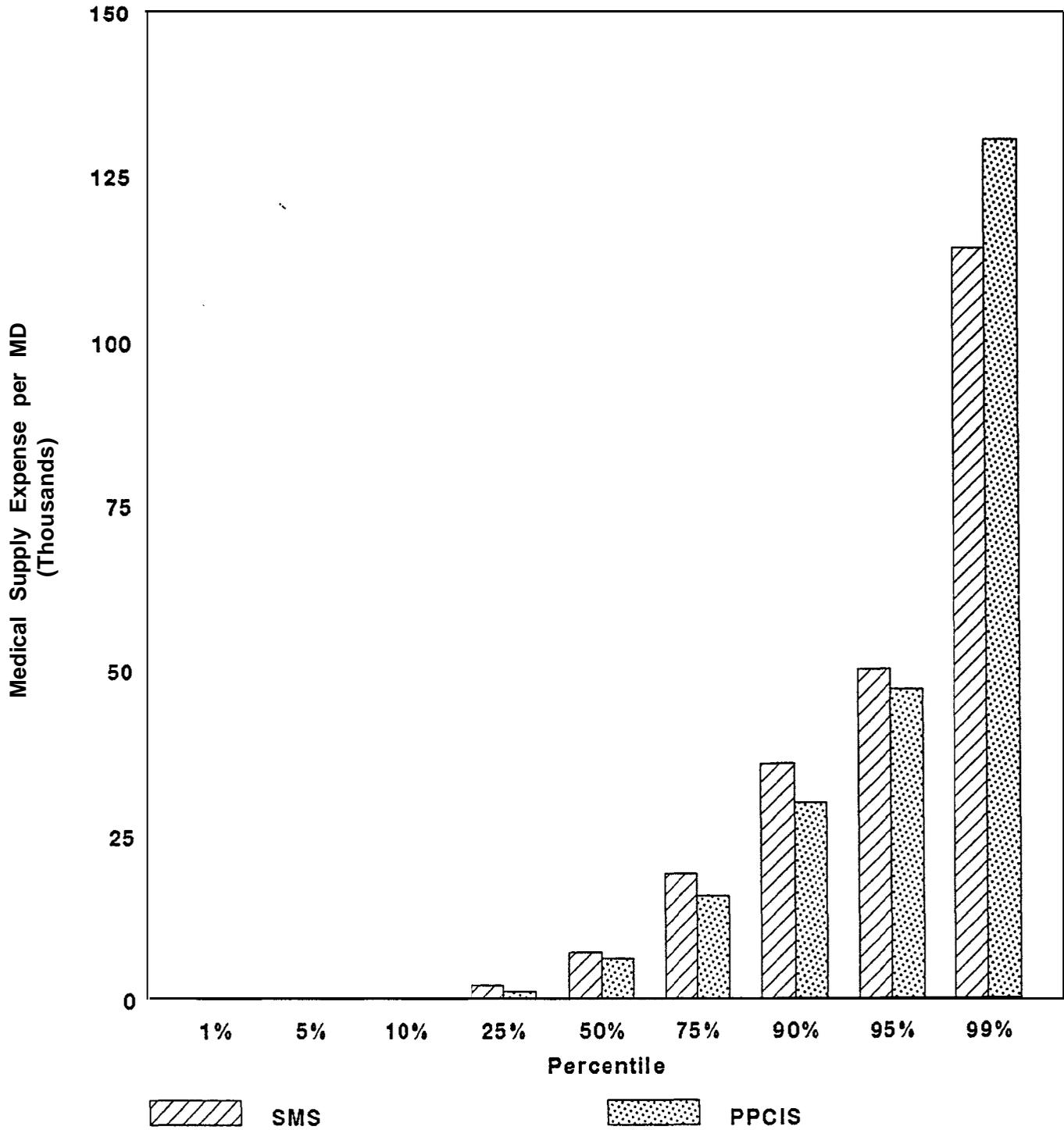


Figure 3-7
DISTRIBUTION OF OTHER EXPENSES PER MD:
SMS VS. PPCIS

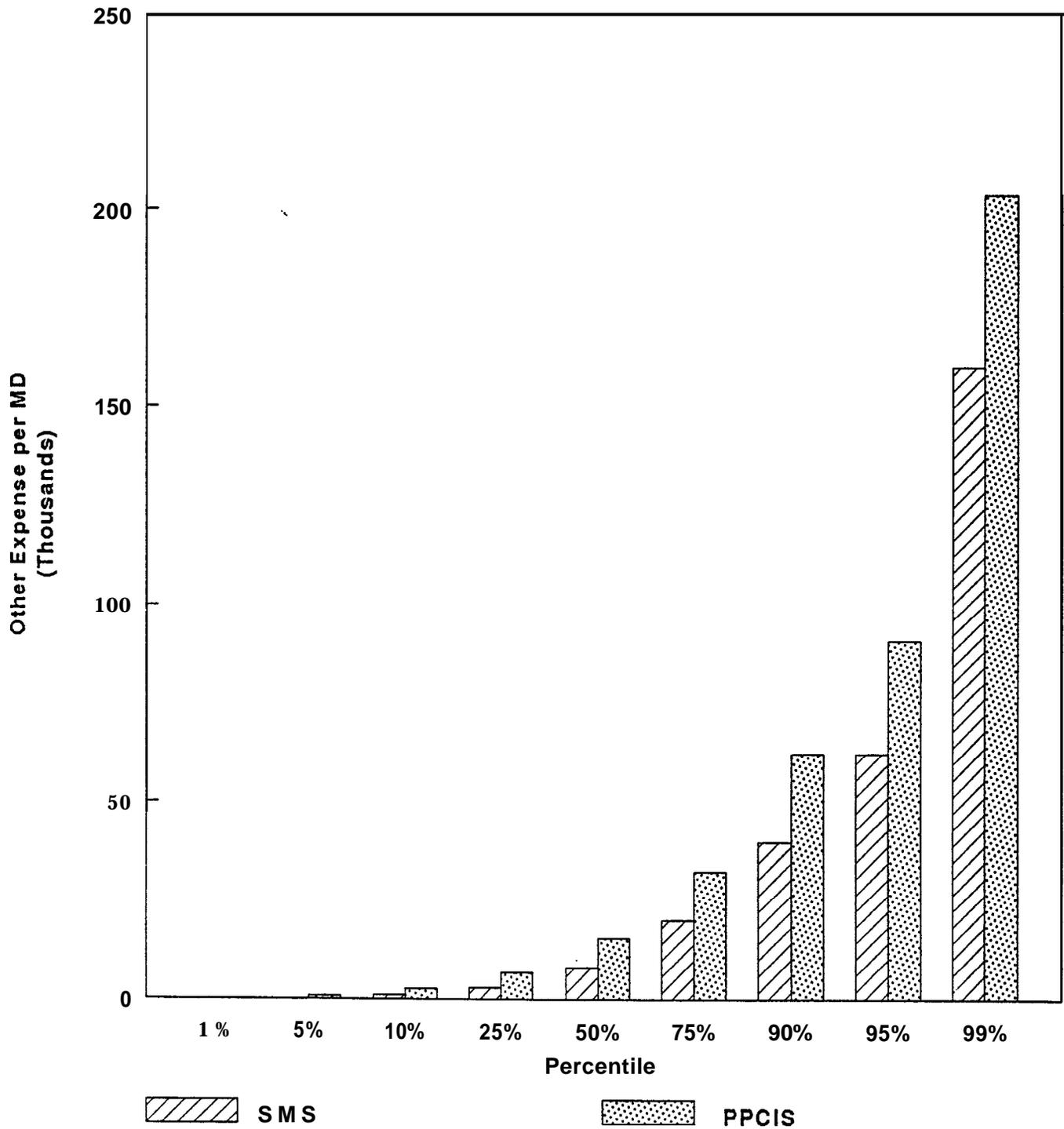
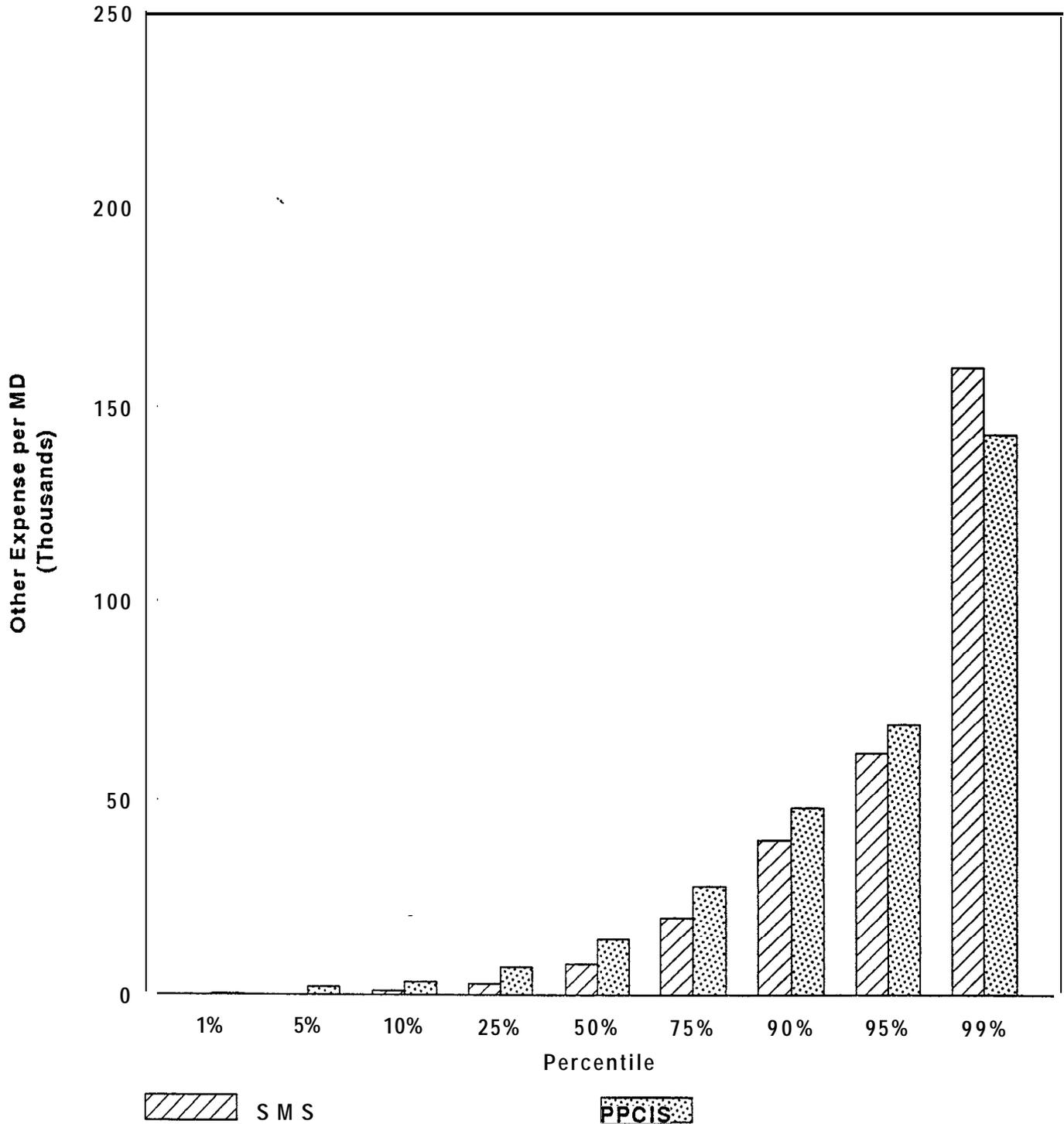
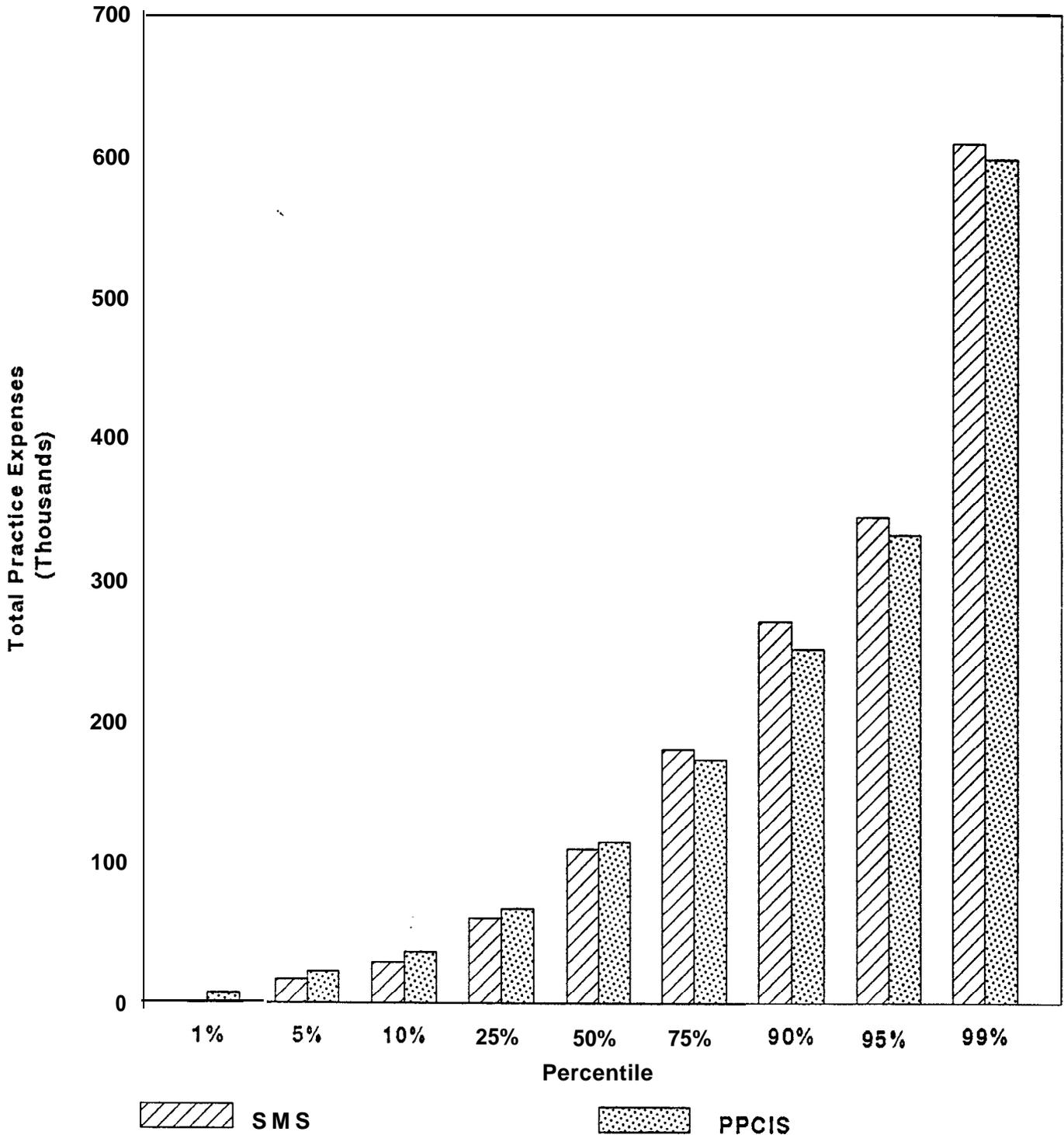


Figure 3-7A
DISTRIBUTION OF OTHER EXPENSES PER MD:
SMS VS.PPCIS*



• Excludes physician employee wages from PPCIS.

**Figure 3-8
DISTRIBUTION OF TOTAL OF EXPENSES:***
SMS VS. PPCIS



(*) Includes physicians reporting complete expense data; excludes physician own income

Figure 3-9
DISTRIBUTION OF TOTAL HOURS PER WEEK:
SMS VS. PPCIS

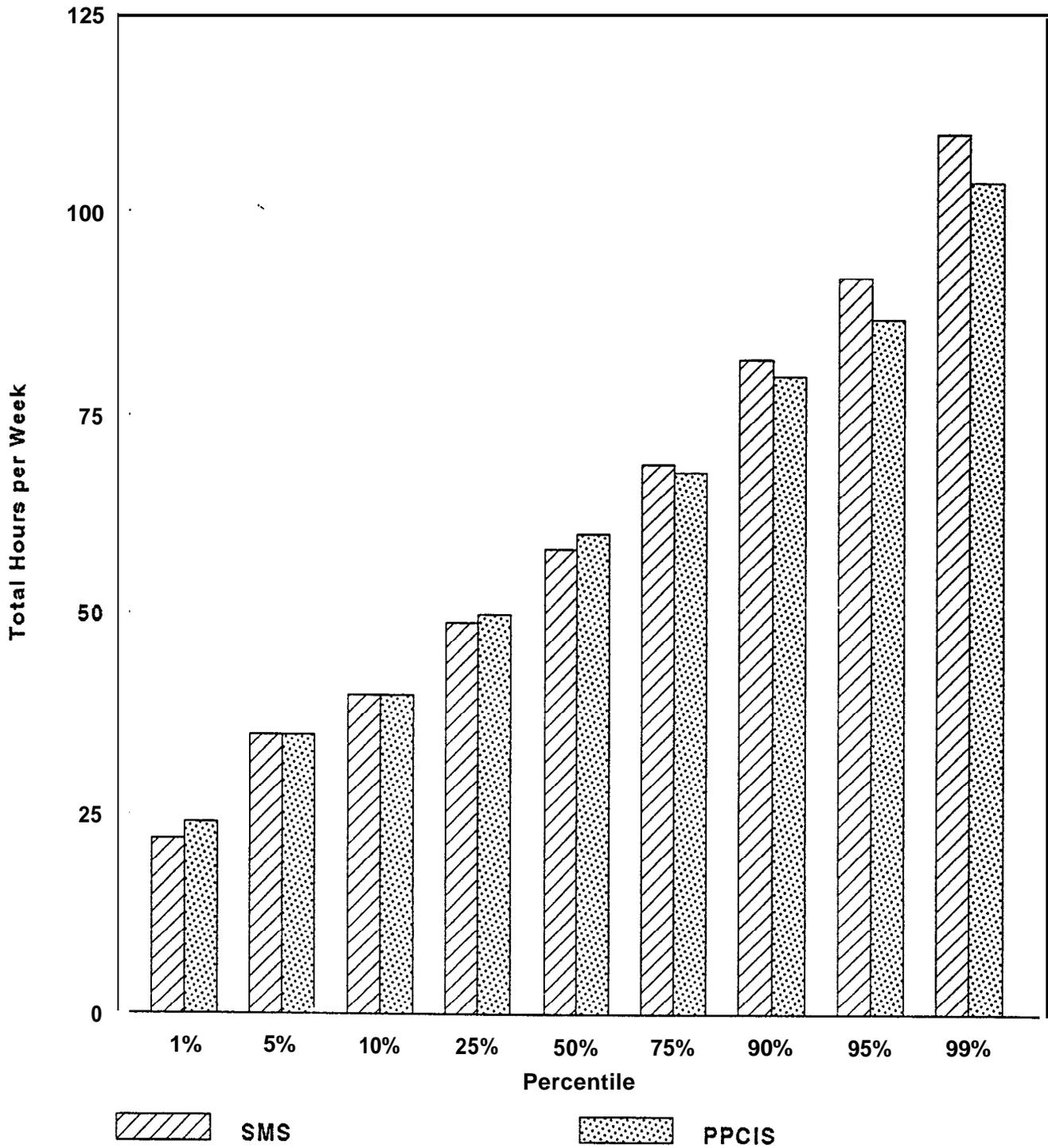


Figure 3-10
DISTRIBUTION OF PATIENT CARE HOURS PER WEEK:
SMS VS. PPCIS

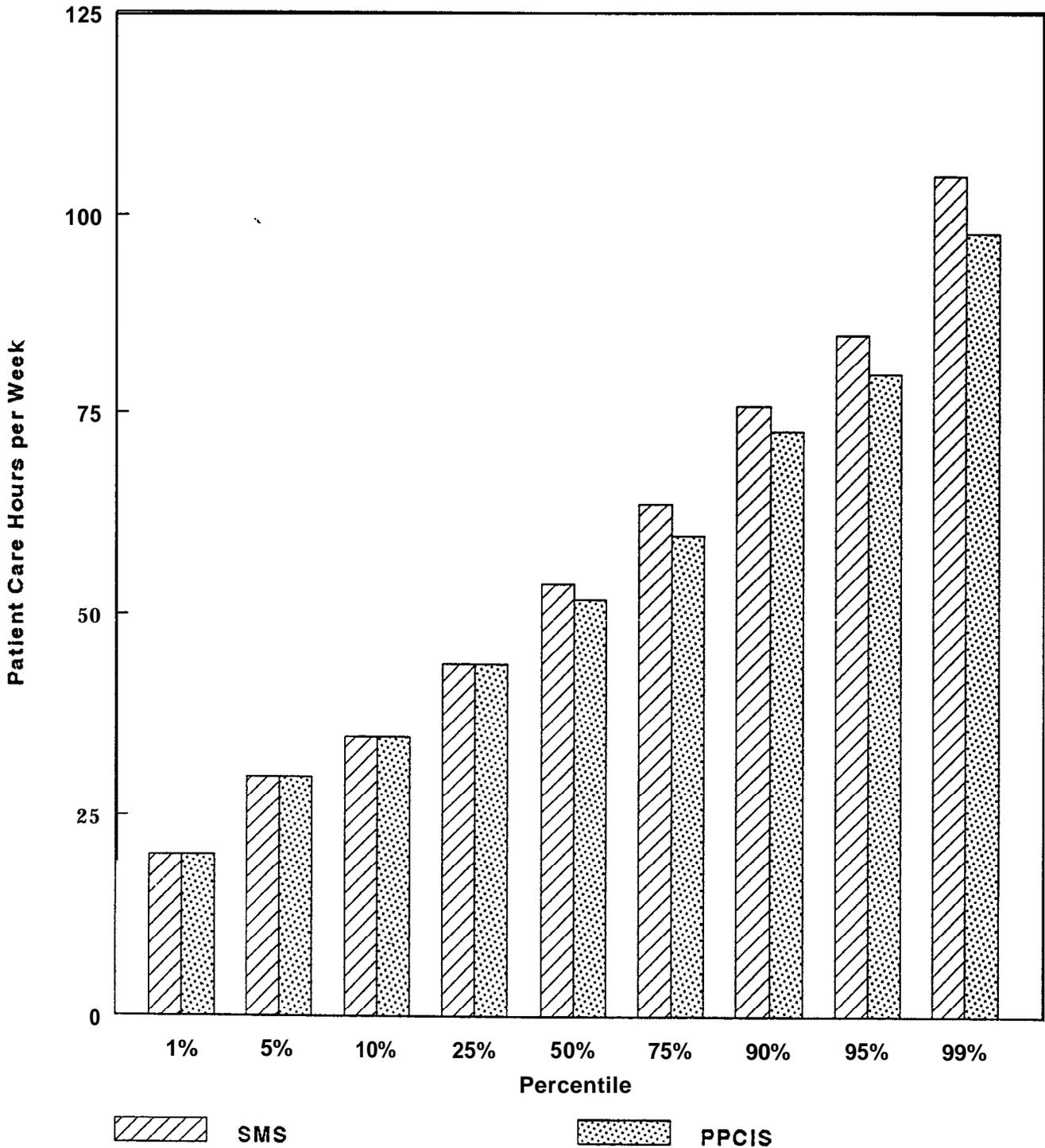
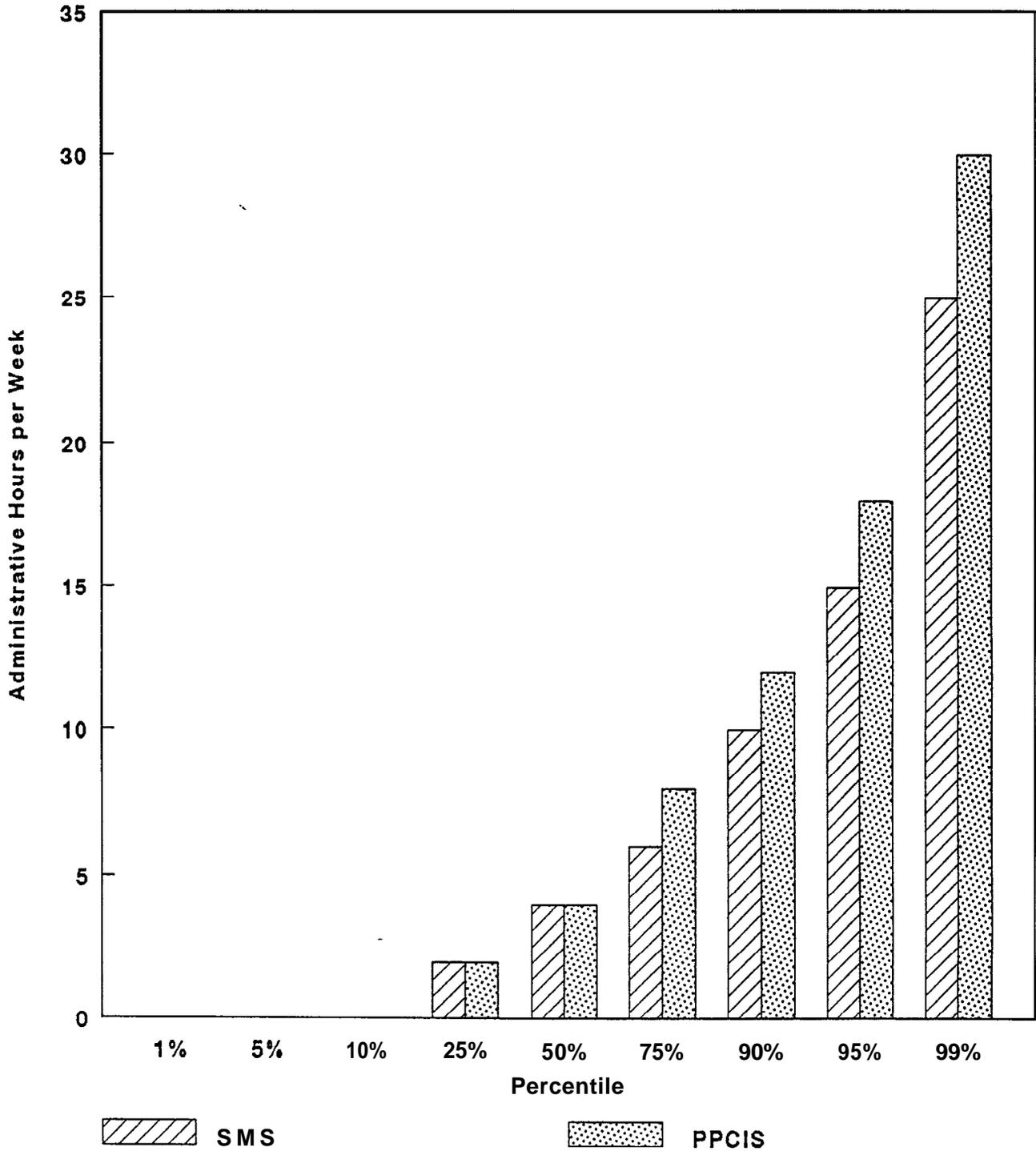
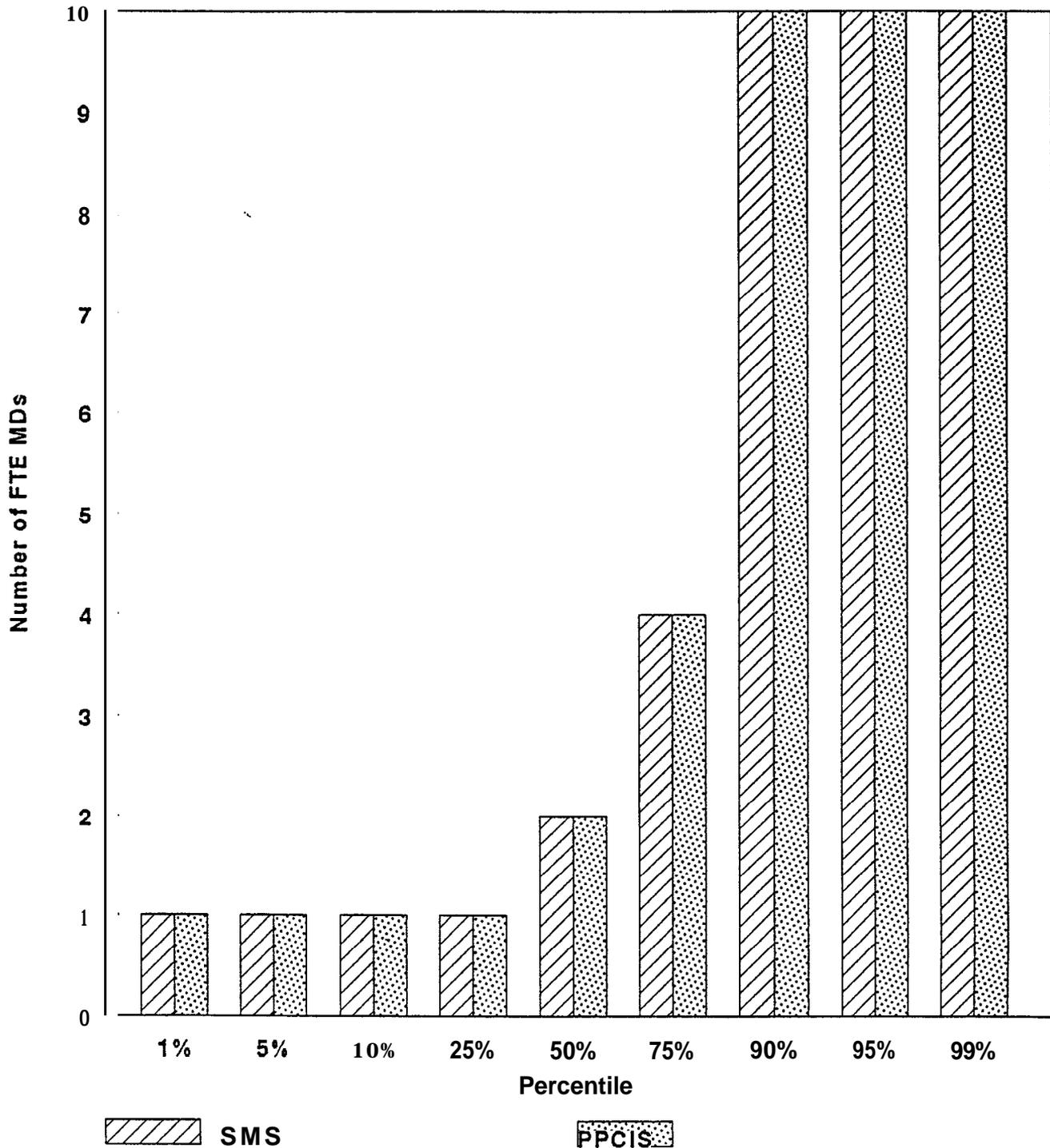


Figure 3-11
DISTRIBUTION OF ADMINISTRATIVE HOURS PER WEEK:
SMS VS. PPCIS

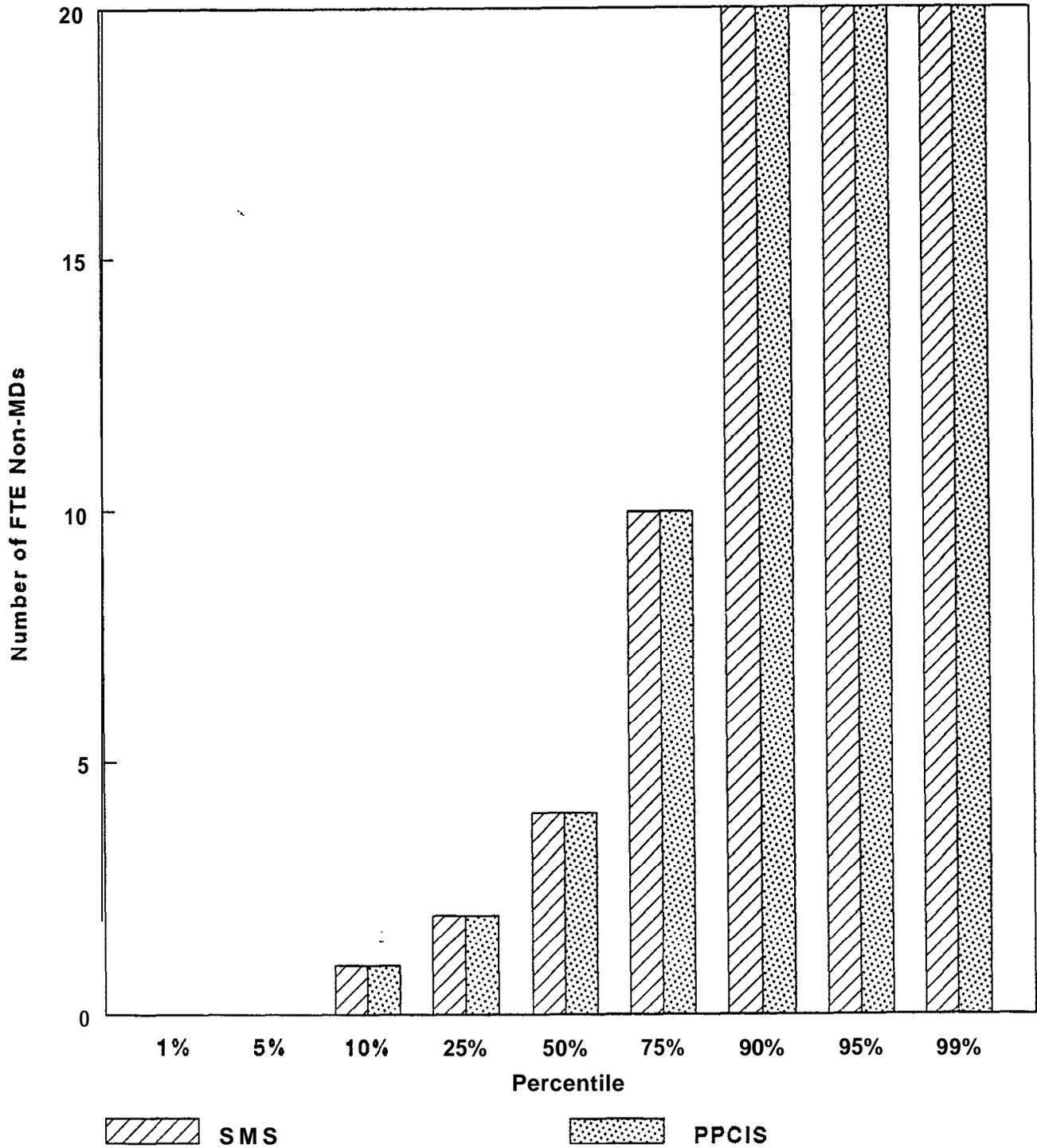


**Figure 3-12
DISTRIBUTION OF THE NUMBER OF FTE MDS*:
SMS VS. PPCIS**



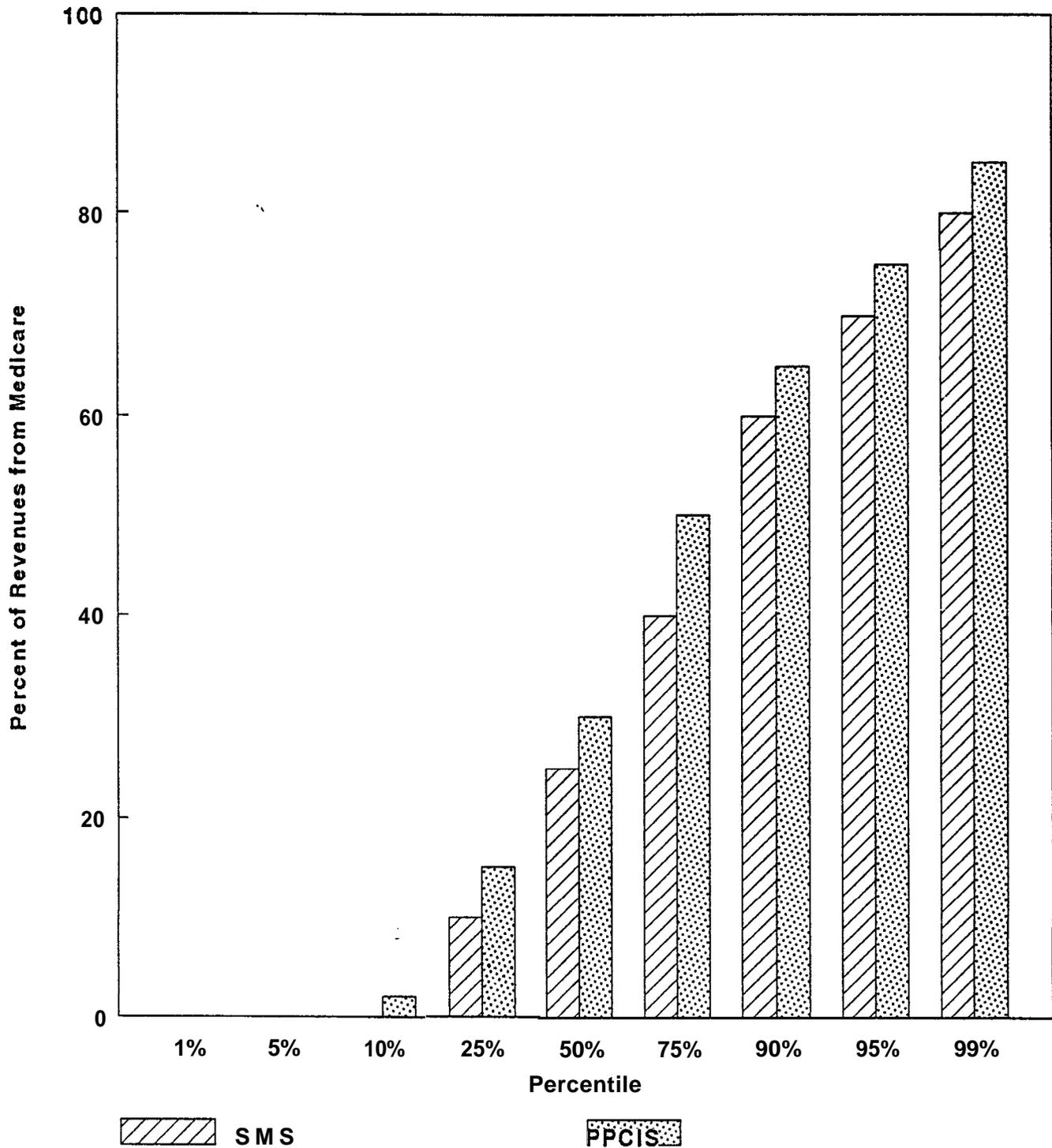
• The distribution is capped at 10 because of restrictions on the SMS public use file.

Figure 3-13
DISTRIBUTION OF THE NUMBER OF FTE NON-MDS*:
SMS VS. PPCIS



* The distribution is capped at 20 because of restrictions on the SMS public use file.

Figure 3-14
DISTRIBUTION OF REVENUES FROM MEDICARE:
SMS VS. PPCIS



4.0 DEVELOPING WEIGHTS FOR THE COMBINED DATABASE

4.1 Methods

A number of methods may be used to combine two probability samples into a single sample. These methods vary in the degree of theoretical and computational complexity. Assuming that two probability samples, each of which is self-weighting (i.e., all cases have relative weights equal to unity), cover exactly the same population, the process of combining samples may be as simple as addition of the cases of one sample to the cases of the other sample. Of course, more complex combination procedures may be used to achieve varying degrees of correction for random and other nonrandom variation and/or bias.

In those instances where the two probability samples are not self-weighting and/or the populations covered by the two samples are not completely overlapping, more complex combination procedures must be used. Again, however, there are a number of options that may be selected in this process.

The PPCIS and SMS surveys involve varying degrees of complexity. The PPCIS makes use of a three dimensional stratification (specialty, region, and urbanity) for the purpose of sample selection. This three dimensional stratification forms the basis of a two stage sample weighting process which takes into account the differential probabilities of selection due to stratification as well as differential rates of frame eligibility and differential rates of nonresponse. It is our understanding that the 1989 SMS used nonstratified random selection coupled with post-stratification weighting. The process of combining the PPCIS and SMS requires that particular attention be given to this complexity in terms of post-stratification and differential weighting.

The actual combination of PPCIS and SMS into a single survey data base was carried out as follows:

1. First a set of H mutually exclusive, mutually exhaustive sub-populations or strata were defined. This stratification was developed so that the combined samples would retain the maximum amount of post-stratification that had been part of their individual **weighting procedures. In particular, this stratification involved the cross classification of three dimensions: Specialty (13 categories);**

Region (4 categories); and Urbanicity (2 categories).*

2. For each of the individual strata a combined sample weighting target, T_h , was established. Because of the experimental nature of this process, two sets of weighting targets were established. One set (i.e., a combined weighting target T_h for each stratum $h=1,\dots,H$) of targets reflected the stratum proportions that were present in the weighted PPCIS. The other set reflected the proportions that exist for the SMS survey. These targets (expressed as a sum of weights) are shown in Tables 4-1 and 4-2. Table 4-1 shows the full cross classification of the three dimensions while Table 4-2 shows this information accumulated at the marginal level. For both the PPCIS and the SMS, these tables show the number of sample cases, the sum of the survey weights for these cases and the percentage associated with the sum of weights. It should be noted that the weights produced and made available in conjunction with the PPCIS are “projection” weights. Projection weights are weights which reflect the size of the population that is being sampled. The sum of the projection weights is equal to the total number of elements in the full population to which the sample is projected. The PPCIS is projected to a total population of 217,970 physicians. The weights made available with the SMS are “relative” weights. Relative weights generally sum to the unweighted sample size. The slight difference between the sum of weights for the SMS and the number of sample cases is a result of the fact that only a portion of the SMS was used in the combining process. We estimate that if the SMS made use of projection weights, the sum of weights would have been approximately 300,564.** This is somewhat higher than the sum of projection weights for the PPCIS. It should be noted that in establishing targets for the various strata, either projection or relative weights may be used.
3. Within each stratum, the total weighting target T_h was distributed among the two samples. That is, two sub-sample targets T_{h1} and T_{h2} , were determined such that $T_{h1} + T_{h2} = T_h$ ***. Because of the experimental nature of the project, two different methods were used

*Refer to Chapter 2 for additional details on the Specialty, Region, and Urbanicity crosswalks between the two surveys.

**This estimate is extremely crude and was derived by multiplying the weighted percent by the AMA population projection within each employment arrangement. Population estimates for ineligible employee categories (58,104) were subtracted from the total population projection (358,668) to obtain an adjusted projection for the subsample (300,564).

***The sample target T_{h1} denotes the total weighted target assigned to one of the samples and T_{h2} denotes the total weighted target allocated to the other sample.

for this determination. In one instance, the sub-stratum targets were proportional to the number of sample cases in the stratum from each of the respective samples. In the other instance, the two targets were proportional to the “effective” sample size from each of the respective samples.*

4. The final combined weight was computed as the original survey weight (on a case-by-case basis) times a factor equal to the sub-sample target for the appropriate stratum divided by the sum of the original survey weights for all cases in the sub-sample stratum. Letting w_{hij} denote the original weight of sample case j , within sub-sample i of stratum, then the combined weight $c_{hii} = w_{hij} \times (T_{hij} / \sum w_{hij})$, where the sum \sum is taken over the subscript j (i.e., all cases within the stratum sub-sample)

4.2 Results

Due to the experimental nature of this project, we generated a total of eight different combination weights for each case. These eight different weights are a result of the cross-classification of three different “options,” each of which has two alternatives. These three options involve:

- (1) targets for the weighting strata -- the targets may come from either the *PPCIS* or the *SMS*;
- (2) total sum of weights -- weights can sum to a *projected* population total or can be *relative* to the combined sample size; and
- (3) distribution of weighted contribution with respect to the two surveys -- the weighted contribution from each survey within stratum may be either *proportional* to the raw sample size or reflect the *effective* sample size.

*The effective sample size was computed as the actual sample size within the stratum divided by 1 plus the rel-variance of the sample weights within the stratum. Let n_{hj} = actual sample size within stratum h of sample i , let RV_{hi} = the relative variance of the sample weights within stratum h of sample i , then the effective sample size $effn_{hi} = n_{hi} / (1 + RV_{hi})$. In the first instance $T_{hi} = (n_{hi} / n_h) \times T_h$, where n_h is the total sample size in the stratum (i.e. $n_h = n_{h1} + n_{h2}$). In the second instance $T_{hi} = (effn_{hi} / effn_h) \times T_h$, where $effn_h = effn_{h1} + effn_{h2}$.

The eight weights are as follows:

	<u>Targets for weighting strata</u>	<u>Total sum weights</u>	<u>Distribution of weighted contribution</u>
PWS1	SMS	PROJECTION	PROPORTIONAL
PWS2	SMS	PROJECTION	EFFECTIVE
RWS1	SMS	RELATIVE	PROPORTIONAL
RWS2	SMS	RELATIVE	EFFECTIVE
PWP1	PPCIS	PROJECTION	PROPORTIONAL
PWP2	PPCIS	PROJECTION	EFFECTIVE
RWP1	PPCIS	RELATIVE	PROPORTIONAL
RWP2	PPCIS	RELATIVE	EFFECTIVE

Table 4-3 shows the percentage marginal distribution (across both samples) by specialty, region and urbanity of these eight different weights. The first four weights (labeled PWS1, PWS2, RWS1 and RWS2) reflect the stratum targets associated with the SMS. For all four weights, the final weighted percentage of physicians that are GP/FP is 15.71 percent. As shown in Table 4-2, this is the percentage of the SMS that is comprised of GPs/FPs. **The** second set of four weights (labeled PWP1, PWP2, RWP1 and RWP2) reflect the stratum targets associated with the PPCIS. For all four weights, the final weighted percentage of physicians that are GP/FP is 14.90 percent. Again, as shown in Table 4-2, this is the percentage of the PPCIS that is GP/FP. The recommended choice between these two options depends upon one's assessment of the weighting and estimation procedures used by the two different surveys. Under certain circumstances, we might even select a third option consisting of a weighted average of target proportions with respect to the various combining strata (not shown).

Tables 4-4 through 4-11 show detailed marginal weight distributions for each of the eight weights. The tables follow the column order used in Table 4-3: PWS1, PWS2, RWS1, RWS2, PWP1, PWP2, RWP1 and RWP2. Each of these tables shows the number of cases, the sum of weights, and the percentage of weights with respect to the three stratum marginals (specialty, region, and urbanicity). These quantities are shown in total and separately for each of the two surveys that are being combined by the weighting process.

Differences among the first four weights (labeled PWS1, PWS2, RWS1, and RWS2) and differences among the second four weights (labeled PWP1, PWP2, RWP1, and RWP2) are the result of differences in the total sum of weights over the entire combined sample and the

relative contribution, within each stratum, of the PPCIS and SMS. All weights with labels beginning with "P" are projection weights. That is, they sum to the total population that is being projected from the survey. All weights with labels beginning with "R" are relative weights. That is, the sum of weights across the combined samples is equal to the total number of cases across the combined samples.

In Tables 4-4 and 4-5, which show weights PWS1 and PWS2 respectively, we find that the sum of weights across the two surveys is 300,564. This is the projected total doctors based on the SMS. In Tables 4-8 and 4-9, which show weights PWP1 and PWP2 respectively, we find the sum of weights across the two surveys is 217,970. This is the projected total doctors based on the PPCIS. In Tables 4-6, 4-7, 4-10, and 4-11, the sum of weights across the two surveys is 6,953. This is equal to the total number of cases in the combined surveys.

In most instances, it is probably simpler to make use of weights which sum to the total number of cases (i.e., relative weights). This simplicity is related to the method by which various computer packages treat the sum of weights in the computation of significance levels and other inferential statistics. In those instances where total estimates are sought, projection weights may be used.

The difference between weights with labels that end with the number "1" and those with labels that end with the number "2" is related to the method used in the allocation of the stratum target between the two samples being combined. Weights with labels ending in "1" have been distributed between the two samples, within stratum, in proportion to sample size. Weights with labels ending in "2" have been distributed between the two samples, within stratum, with respect to estimated "effective" sample size.

Examination of the PPCIS and SMS distributions shown in Tables 4-4 and 4-5 illustrate the fact that with these two data sets, the differences between the two allocation methods (proportional or effective) are quite small. However, in general, we recommend that the second option be used. That is, within the strata that are used for combining samples, the sum of weights from each sample should be distributed accordingly to the effective sample size for each sample, rather than proportional to the actual size.

TABLE 4-1
SUMS OF ORIGINAL SURVEY WEIGHTS BY CELL: PPCIS AND SMS*

<u>Specialty</u>	<u>Region</u>	<u>Urbanicity</u>	<u>PPCIS</u>			<u>SMS</u>		
			<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights</u>
GP/FP	Northeast	Rural	15	743	0.34%	20	20	0.57%
GP/FP	Northeast	Urban	46	4,426	2.03	61	61	1.78
GP/FP	North Central	Rural	69	3,168	1.45	64	59	1.71
GP/FP	North Central	Urban	54	5,613	2.58	98	92	2.67
GP/FP	South	Rural	88	4,374	2.01	95	87	2.53
GP/FP	South	Urban	64	6,448	2.96	118	111	3.24
GP/FP	West	Rural	35	1,626	0.75	26	25	0.73
GP/FP	west	Urban	61	6,078	2.79	85	85	2.48
Internal Medicine	Northeast	Rural	18	559	0.26	9	11	0.31
Internal Medicine	Northeast	Urban	72	6,433	2.95	98	117	3.39
Internal Medicine	North Central	Rural	24	965	0.44	16	18	0.52
internal Medicine	North Central	Urban	65	4,579	2.10	91	102	2.98
Internal Medicine	South	Rural	43	1,501	0.69	30	34	0.99
Internal Medicine	South	Urban	83	6,405	2.94	96	106	3.09
Internal Medicine	West	Rural	13	547	0.25	11	13	0.39
Internal Medicine	West	Urban	55	4,589	2.11	60	71	2.05
Medical Subspecialties	Northeast	Rural	13	229	0.11	8	9	0.26
Medical Subspecialties	Northeast	Urban	105	8,173	3.75	70	81	2.36
Medical Subspecialties	North Central	Rural	15	549	0.25	2	2	0.07
Medical Subspecialties	North Central	Urban	76	5,256	2.41	34	37	1.07
Medical Subspecialties	South	Rural	30	998	0.46	12	13	0.38
Medical Subspecialties	South	Urban	145	8,691	3.99	63	72	2.10
Medical Subspecialties	West	Rural	10	303	0.14	2	2	0.06
Medical Subspecialties	West	Urban	79	5,388	2.47	42	47	1.36
General Surgery	Northeast	Rural	13	392	0.18	7	7	0.20
General Surgery	Northeast	Urban	35	2,697	1.24	40	42	1.23
General Surgery	North Central	Rural	26	934	0.43	23	22	0.65
General Surgery	North Central	Urban	27	2,044	0.94	34	32	0.94
General Surgery	South	Rural	40	1,310	0.60	19	19	0.55
General Surgery	South	Urban	41	3,028	1.39	56	54	1.57
General Surgery	West	Rural	15	484	0.22	9	10	0.29
General Surgery	West	Urban	21	1,570	0.72	44	44	1.27
Surgical Subspecialties	Northeast	Rural	21	706	0.32	13	13	0.38
Surgical Subspecialties	Northeast	Urban	147	8,062	3.70	122	118	3.43
Surgical Subspecialties	North Central	Rural	37	1,095	0.50	19	18	0.52
Surgical Subspecialties	North Central	Urban	149	6,580	3.02	115	109	3.17
Surgical Subspecialties	South	Rural	76	1,839	0.84	34	32	0.93
Surgical Subspecialties	South	Urban	227	11,714	5.37	174	171	4.98
Surgical Subspecialties	West	Rural	24	743	0.34	14	14	0.39
Surgical Subspecialties	West	Urban	163	8,205	3.76	88	87	2.53
Pediatrics	Northeast	Rural	4	245	0.11	7	6	0.17
Pediatrics	Northeast	Urban	28	3,626	1.66	59	50	1.45
Pediatrics	North Central	Rural	9	479	0.22	5	5	0.14
Pediatrics	North Central	Urban	21	2,107	0.97	46	40	1.16
Pediatrics	South	Rural	11	663	0.30	16	16	0.47
Pediatrics	South	Urban	37	3,894	1.79	72	62	1.79
Pediatrics	West	Rural	3	178	0.08	9	8	0.23
Pediatrics	West	Urban	31	3,173	1.46	42	39	1.12

TABLE 4-1, cont'd.

<u>Specialty</u>	<u>Region</u>	<u>Urbanicity</u>	<u>PPCIS</u>			<u>SMS</u>		
			<u>N</u>	<u>Sum of Weights</u>	<u>Percent Weights</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent Weights</u>
OB/GYN	Northeast	Rural	6	286	0.13	9	a	0.22
OB/GYN	Northeast	Urban	48	3,632	1.67	55	54	1.58
OBIGYN	North Central	Rural	15	438	0.20	7	7	0.19
OBIGYN	North Central	Urban	35	2,701	1.24	49	49	1.42
OB/GYN	South	Rural	30	1,097	0.50	1a	19	0.57
OBIGYN	South	Urban	80	5,297	2.43	73	78	2.26
OB/GYN	West	Rural	13	331	0.15	7	9	0.27
OB/GYN	West	Urban	44	3,414	1.57	39	37	1.0a
Radiology	Northeast	Rural	10	345	0.16	3	2	0.07
Radiology	Northeast	Urban	36	2,624	1.20	36	30	0.88
Radiology	North Central	Rural	16	560	0.26	16	13	0.36
Radiology	North Central	Urban	28	2,126	0.98	41	37	1.07
Radiology	South	Rural	17	740	0.34	20	17	0.49
Radiology	South	Urban	40	3,530	1.62	71	55	1.60
Radiology	West	Rural	5	238	0.11	7	6	0.16
Radiology	West	Urban	32	2,116	0.97	35	29	0.85
Psychiatry	Northeast	Rural	2	52	0.02	4	3	0.10
Psychiatry	Northeast	Urban	45	2,718	1.25	53	64	1.85
Psychiatry	North Central	Rural	4	115	0.05	5	4	0.11
Psychiatry	North Central	Urban	35	1,982	0.91	32	34	0.98
Psychiatry	South	Rural	4	129	0.06	2	2	0.06
Psychiatry	South	Urban	63	3,553	1.63	46	52	1.52
Psychiatry	West	Rural	3	79	0.04	1	2	0.04
Psychiatry	West	Urban	51	3,037	1.39	37	44	1.28
Anesthesiology	Northeast	Rural	a	209	0.10	3	3	0.10
Anesthesiology	Northeast	Urban	39	2,229	1.02	29	29	0.85
Anesthesiology	North Central	Rural	10	292	0.13	4	6	0.17
Anesthesiology	North Central	Urban	36	2,106	0.97	37	39	1.12
Anesthesiology	South	Rural	14	408	0.19	7	7	0.22
Anesthesiology	South	Urban	54	3,318	1.52	55	59	1.71
Anesthesiology	West	Rural	7	240	0.11	4	4	0.11
Anesthesiology	West	Urban	48	3,013	1.38	32	36	1.06
Pathology	Northeast	Rural	0	0	0.00	1	1	0.02
Pathology	Northeast	Urban	2	170	0.08	7	6	0.16
Pathology	North Central	Rural	4	212	0.10	4	3	0.08
Pathology	North Central	Urban	5	453	0.21	16	13	0.38
Pathology	South	Rural	3	165	0.08	6	5	0.14
Pathology	South	Urban	16	1,675	0.77	22	16	0.46
Pathology	West	Rural	3	133	0.06	3	6	0.17
Pathology	West	Urban	12	973	0.45	16	10	0.30
Emergency Medicine	Northeast	Rural	1	42	0.02	2	3	0.08
Emergency Medicine	Northeast	Urban	11	1,000	0.46	10	11	0.31
Emergency Medicine	North Central	Rural	3	146	0.07	6	6	0.19
Emergency Medicine	North Central	Urban	14	1,273	0.58	24	23	0.66
Emergency Medicine	South	Rural	10	555	0.25	7	a	0.22
Emergency Medicine	South	Urban	16	1,459	0.67	27	25	0.73
Emergency Medicine	West	Rural	4	1a2	0.08	a	a	0.23
Emergency Medicine	West	Urban	15	1,213	0.56	24	22	0.65

TABLE 4-1, cont'd.

<u>Specialty</u>	<u>Region</u>	<u>Urbanicity</u>	<u>PPCIS</u>			<u>SMS</u>		
			<u>N</u>	<u>Sum of Weights</u>	<u>Percent Weights</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent Weights</u>
Other Specialties	Northeast	Rural	0	0	0.00	3	3	0.07
Other Specialties	Northeast	Urban	1	100	0.05	41	39	1.15
Other Specialties	North Central	Rural	0	0	0.00	4	3	0.10
Other Specialties	North Central	Urban	3	300	0.14	29	28	0.60
Other Specialties	South	Rural	0	0	0.00	4	4	0.12
Other Specialties	South	Urban	4	374	0.17	37	36	1.04
Other Specialties	West	Rural	1	64	0.03	3	4	0.11
Other Specialties	West	Urban	15	1,116	0.51	29	27	0.80
TOTAL			3,505	217,970	99.66	3,440	3,435	99.44

Note: The PPCIS uses projection weights to project to the population; the SMS uses relative weights to project to the sample size.

~~1989~~ PPCIS and 1989 Core SMS.

TABLE 4-2
SUM OF ORIGINAL SURVEY WEIGHTS BY STRATUM: PPCIS AND SMS

	PPCIS			SMS		
	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights</u>
Specialty						
GP/FP	432	32,476	14.90%	567	540	15.71
Internal Medicine	373	25,578	11.73	411	472	13.73
Medical Subspecialties	473	29,587	13.57	233	264	7.68
General Surgery	218	12,457	5.72	232	230	6.71
Surgical Subspecialties	844	38,946	17.87	579	560	16.32
Pediatrics	144	14,365	6.59	256	224	6.53
OB/GYN	271	17,197	7.89	257	260	7.58
Radiology	184	12,279	5.63	229	188	5.48
Psychiatry	207	11,666	5.35	180	204	5.94
Anesthesiology	216	11,816	5.42	171	183	5.33
Pathology	45	3,781	1.73	75	59	1.72
Emergency Medicine	74	5,868	2.69	108	106	3.08
Other Specialties	24	1,954	0.90	150	144	4.20
Region						
Northeast	726	49,699	22.80	770	789	22.96
North Central	780	46,072	21.14	821	798	23.24
South	1,236	73,167	33.57	1,180	1,160	33.76
West	763	49,032	22.49	677	688	20.04
Urbanicity						
Rural	845	31,688	14.54	638	625	18.20
Urban	2,660	186,282	85.46	2,810	2,810	81.80
Total	3,505	217,970	100.00	3,448	3,435	100.00

Sources: 1988 PPCIS and 1989 Core SMS.

**TABLE 4-3
PERCENT OF WEIGHTS FOR EIGHT DIFFERENT WEIGHTS***

	SMS STRATUM TARGETS				PPCIS STRATUM TARGETS			
	Percent of Weights (PWS1)	Percent of Weights (PWS2)	Percent of Weights (RWS1)	Percent of Weights (RWS2)	Percent of Weights (PWP1)	Percent of Weights (PWP2)	Percent of Weights (RWP1)	Percent of Weights (RWP2)
Specialty								
GP/FP	15.71%	15.71%	15.71%	15.71%	14.89%	14.89%	14.89%	14.89%
Internal Medicine	13.73	13.73	13.73	13.73	11.73	11.73	11.73	11.73
Medical Subspecialties	7.68	7.68	7.68	7.68	13.57	13.57	13.57	13.57
General Surgery	6.71	6.71	6.71	6.71	5.72	5.72	5.72	5.72
Surgical Subspecialties	16.32	16.32	16.32	16.32	17.87	17.87	17.87	17.87
Pediatrics	6.53	6.53	6.53	6.53	6.59	6.59	6.59	6.59
OB/GYN	7.58	7.58	7.58	7.58	7.89	7.89	7.89	7.89
Radiology	5.48	5.48	5.48	5.48	5.63	5.63	5.63	5.63
Psychiatry	5.94	5.94	5.94	5.94	5.35	5.35	5.35	5.35
Anesthesiology	5.33	5.33	5.33	5.33	5.42	5.42	5.42	5.42
Pathology	1.72	1.72	1.72	1.72	1.73	1.73	1.73	1.73
Emergency Medicine	3.08	3.08	3.08	3.08	2.69	2.69	2.69	2.69
Other Specialties	4.20	4.20	4.20	4.20	0.90	0.90	0.90	0.90
Region								
Northeast	22.96	22.96	22.96	22.96	22.80	22.80	22.80	22.80
North Central	23.24	23.24	23.24	23.24	21.14	21.14	21.14	21.14
South	33.76	33.76	33.76	33.76	33.57	33.57	33.57	33.57
West	20.04	20.04	20.04	20.04	22.49	22.49	22.49	22.49
Urbanicity								
Rural	18.17	18.17	18.17	18.17	14.58	14.58	14.58	14.58
Urban	81.83	81.83	81.83	81.83	85.42	85.42	85.42	85.42
Total %	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total N	(300,564)	(300,564)	(6,953)	(6,953)	(217,970)	(217,970)	(6,953)	(6,953)

* See text for definition of weights.

Source: CHER Combined Physician Database.

TABLE 4-4

SUM OF WEIGHTS (PWS1) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

	PPCIS			SMS			COMBINED		
	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWS1)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWS2)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWS2)</u>
Specialty									
GP/FP	432	20,007	13.94	567	27,213	17.33	999	47,220	15.71
Internal Medicine	373	19,262	13.42	411	22,012	14.02	784	41,274	13.73
Medical Subspecialties	473	15,213	10.60	233	7,856	5.00	706	23,069	7.68
General Surgery	218	9,305	6.48	232	10,859	6.91	450	20,164	6.71
Surgical Subspecialties	844	18,810	13.11	579	20,238	12.89	1,423	39,048	12.99
Pediatrics	144	6,956	4.85	256	12,681	8.07	400	19,637	6.53
OB/GYN	271	11,503	8.02	257	11,287	7.19	528	22,790	7.58
Radiology	184	7,154	4.99	229	9,307	5.93	413	18,461	5.48
Psychiatry	207	9,420	6.56	180	8,430	5.37	387	17,850	5.94
Anesthesiology	216	8,798	6.13	171	7,220	4.60	387	16,018	5.33
Pathology	45	1,873	1.31	75	3,287	2.09	120	5,160	1.72
Emergency Medicine	74	3,684	2.57	108	5,561	3.54	182	9,245	3.08
Other Specialties	24	1,522	1.06	150	11,107	7.07	174	12,629	4.20
Region									
Northeast	726	31,790	22.15	770	37,220	23.70	1,496	69,010	22.96
North Central	780	31,921	22.24	821	37,933	24.15	1,601	69,854	23.24
South	1,236	49,285	34.34	1,180	52,186	33.23	2,416	101,471	33.76
West	763	30,510	21.26	677	29,718	18.92	1,440	60,228	20.04
Urbanicity									
Rural	845	29,588	20.62	638	25,027	15.93	1,483	54,615	18.17
Urban	2,660	113,919	79.38	2,810	132,030	84.07	5,470	245,949	81.83
Total	3,505	143,507	100.00	3,448	157,057	100.00	6,953	300,564	100.00

Source: CHER Combined Physician Database.

TABLE 4-5

SUM OF WEIGHTS (PWS2) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

	PPCIS			SMS			COMBINED		
	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWS2)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWS2)</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWS2)</u>	
Specialty									
GP/FP	432	20,168	14.25	567	27,052	17.02	999	47,220	15.71
Internal Medicine	373	19,332	13.65	411	21,941	13.80	784	41,274	13.73
Medical Subspecialties	473	14,095	9.96	233	8,974	5.64	706	23,069	7.68
General Surgery	218	9,366	6.62	232	10,799	6.79	450	20,164	6.71
Surgical Subspecialties	644	26,377	18.63	579	22,671	14.26	1,423	49,048	16.32
Pediatrics	144	7,031	4.97	256	12,606	7.93	400	19,637	6.53
OB/GYN	271	12,085	8.54	257	10,705	6.73	528	22,790	7.58
Radiology	184	7,186	5.08	229	9,275	5.83	413	16,461	5.48
Psychiatry	207	9,630	6.80	180	8,220	5.17	387	17,850	5.94
Anesthesiology	216	9,129	6.45	171	6,890	4.33	387	16,018	5.33
Pathology	45	2,017	1.42	75	3,143	1.98	120	5,159	1.72
Emergency Medicine	74	3,676	2.60	108	5,569	3.50	182	9,245	3.08
Other Specialties	24	1,490	1.05	150	11,139	7.01	174	12,629	4.20
Region									
Northeast	726	31,098	21.96	770	37,913	23.85	1,496	69,011	22.96
North Central	780	31,766	22.44	821	38,087	23.96	1,601	69,854	23.24
South	1,238	48,673	34.38	1,180	52,798	33.21	2,416	101,471	33.76
West	763	30,043	21.22	677	30,186	18.99	1,440	60,228	20.04
Urbanicity									
Rural	845	29,064	20.53	638	25,550	16.07	1,483	54,614	18.17
Urban	2,660	112,516	79.47	2,810	133,435	83.93	5,470	245,950	81.83
Total	3,505	141,580	100.00	3,448	158,984	100.00	6,953	300,564	100.00

Source: CHEF? Combined Physician Database.

TABLE 4-6

SUM OF WEIGHTS (RWS1) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

Specialty	PPCIS			SMS			COMBINED		
	N	Sum of Weights	Percent of Weights (RWS1)	N	Sum of Weights	Percent of Weights (RWS1)	N	Sum of Weights	Percent of Weights (RWS1)
GP/FP	432	463	13.94	567	630	17.33	999	1,092	15.71
Internal Medicine	373	446	13.42	411	509	14.02	784	955	13.73
Medical Subspecialties	473	352	10.60	233	182	5.00	706	534	7.68
General Surgery	218	215	6.48	232	251	6.91	450	466	6.71
Surgical Subspecialties	844	666	20.08	579	468	12.89	1,423	1,135	16.32
Pediatrics	144	161	4.85	256	293	8.07	400	454	6.53
OB/GYN	271	266	8.02	257	261	7.19	528	527	7.58
Radiology	184	165	4.99	229	215	5.93	413	381	5.48
Psychiatry	207	218	6.56	180	195	5.37	387	413	5.94
Anesthesiology	216	204	6.13	171	167	4.60	387	371	5.33
Pathology	45	43	1.30	75	76	2.09	120	119	1.72
Emergency Medicine	74	85	2.57	108	129	3.54	182	214	3.08
Other Specialties	24	35	1.06	150	257	7.07	174	292	4.20
Region									
Northeast	726	735	22.15	770	861	23.70	1,496	1,596	22.96
North Central	780	738	22.24	821	878	24.15	1,601	1,616	23.24
South	1,236	1,140	34.34	1,180	1,207	33.23	2,416	2,347	33.76
west	763	706	21.26	677	687	18.92	1,440	1,393	20.04
Urbanicity									
Rural	845	684	20.62	638	579	15.94	1,483	1,263	18.17
Urban	2,660	2,635	79.38	2,810	3,054	84.06	5,470	5,690	81.83
Total	3,505	3,320	100.00	3,448	3,633	100.00	6,953	6,953	100.00

Source: CHER Combined Physician Database.

TABLE 4-7

SUM OF WEIGHTS (RWS2) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

Specialty	PPCIS			SMS			COMBINED		
	N	Sum of Weights	Percent of Weights (NWS1)	Sum of Weights	Percent of Weights (NWS1)	Sum of Weights	Percent of Weights (RWS1)		
GP/FP	432	467	14.26	567	626	17.02	999	1,093	15.71
Internal Medicine	373	447	13.65	411	508	13.81	784	955	13.73
Medical Subspecialties	473	326	9.95	233	208	5.66	706	534	7.68
General Surgery	218	217	6.63	232	250	6.80	450	467	6.71
Surgical Subspecialties	844	610	18.63	579	524	14.25	1,423	1,134	16.32
Pediatrics	144	163	4.98	256	292	7.94	400	455	6.53
OB/GYN	271	280	8.55	257	248	6.74	528	528	7.58
Radiology	184	166	5.07	229	215	5.85	413	381	5.48
Psychiatry	207	223	6.81	180	190	5.17	387	413	5.94
Anesthesiology	218	211	6.44	171	159	4.32	387	370	5.33
Pathology	45	47	1.44	75	73	1.98	120	120	1.72
Emergency Medicine	74	85	2.60	108	129	3.51	182	214	3.08
Other Specialties	24	34	1.04	150	258	7.01	174	292	4.20
Region									
Northeast	726	719	21.95	770	877	23.84	1,496	1,596	22.96
North Central	780	735	22.44	821	881	23.95	1,601	1,616	23.24
South	1,236	1,126	34.38	1,180	1,221	33.20	2,416	2,347	33.76
West	763	695	21.22	677	698	18.98	1,440	1,393	20.04
Urbanicity									
Rural	845	672	20.52	638	591	16.07	1,483	1,263	18.17
Urban	2,660	2,603	79.48	2,810	3,087	83.93	5,470	5,690	81.83
Total	3,505	3,275	100.00	3,448	3,678	100.00	6,953	6,953	100.00

Source: CHER Combined Physician Database.

TABLE 4-8

SUM OF WEIGHTS (PWP1) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

	PPCIS			SMS			COMBINED		
	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWP1)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWP1)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (PWP1)</u>
Specialty									
GP/FP	432	13,702	12.36	567	18,774	17.52	999	32,476	14.90
Internal Medicine	373	11,929	10.76	411	13,649	12.74	784	25,578	11.73
Medical Subspecialties	473	19,703	17.78	233	9,884	9.23	706	29,587	13.57
General Surgery	218	5,890	5.31	232	6,567	6.13	450	12,457	5.72
Surgical Subspecialties	844	22,979	20.73	579	15,967	14.90	1,423	38,946	17.87
Pediatrics	144	5,208	4.70	256	9,157	8.55	400	14,365	6.59
OB/GYN	271	8,712	7.86	257	8,485	7.92	528	17,197	7.89
Radiology	184	5,442	4.91	229	6,837	6.38	413	12,279	5.63
Psychiatry	207	6,311	5.69	180	5,355	5.00	367	11,666	5.35
Anesthesiology	216	6,554	5.91	171	5,262	4.91	387	11,816	5.42
Pathology	45	1,491	1.35	75	2,289	2.14	120	3,781	1.73
Emergency Medicine	74	2,451	2.21	108	3,417	3.19	182	5,868	2.69
Other Specialties	24	457	0.41	150	1,497	1.40	174	1,954	0.90
Region									
Northeast	726	24,630	22.22	770	25,069	23.40	1,496	49,699	22.80
North Central	780	22,703	20.48	821	23,369	21.81	1,601	46,072	21.14
South	1,236	37,445	33.79	1,180	35,722	33.34	2,416	73,167	33.57
West	763	26,054	23.51	677	22,978	21.45	1,440	49,032	22.49
Urbanicity									
Rural	845	18,264	16.48	638	13,507	12.61	1,483	31,772	14.58
Urban	2,660	92,567	83.52	2,810	93,631	87.39	5,470	186,198	85.42
Total	3,505	110,831	100.00	3,448	107,139	100.00	6,953	217,970	100.00

Source. CHER Combined Physician Database.

TABLE 4-9

SUM OF WEIGHTS (PWP2) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

	PPCIS			SMS			COMBINED		
	N	Sum of Weights	Percent of Weights (PWP2)	N	Sum of Weights	Percent of Weights (PWP2)	N	Sum of Weights	Percent of Weights (PWP2)
Specialty									
GP/FP	432	13,799	12.70	567	18,676	17.08	999	32,476	14.90
Internal Medicine	373	11,974	11.02	411	13,604	12.44	784	25,578	11.73
Medical Subspecialties	473	18,328	16.87	233	11,259	10.30	706	29,587	13.57
General Surgery	218	5,929	5.46	232	6,528	5.97	450	12,457	5.72
Surgical Subspecialties	844	21,044	19.37	579	17,902	16.38	1,423	38,946	17.87
Pediatrics	144	5,264	4.84	256	9,101	8.33	400	14,365	6.59
OB/GYN	271	9,125	8.40	257	8,072	7.38	528	17,197	7.89
Radiology	184	5,472	5.04	229	6,807	6.23	413	12,279	5.63
Psychiatry	207	6,469	5.95	180	5,197	4.75	387	11,666	5.35
Anesthesiology	216	6,794	6.25	171	5,022	4.59	387	11,816	5.42
Pathology	45	1,575	1.45	75	2,206	2.02	120	3,781	1.73
Emergency Medicine	74	2,446	2.25	108	3,423	3.13	182	5,868	2.69
Other Specialties	24	432	0.40	150	1,522	1.39	174	1,954	0.90
Region									
Northeast	726	24,025	22.11	770	25,674	23.49	1,496	49,699	22.80
North Central	780	22,443	20.66	821	23,629	21.61	1,601	46,072	21.14
South	1,236	36,779	33.85	1,180	36,388	33.29	2,416	73,167	33.57
West	763	25,405	23.38	677	23,627	21.61	1,440	49,032	22.49
Urbanicity									
Rural	845	17,879	16.46	638	13,893	12.71	1,483	31,772	14.58
Urban	2,660	90,773	83.54	2,810	95,426	87.29	5,470	186,198	85.42
Total	3,505	108,652	100.00	3,448	109,318	100.00	6,953	217,970	100.00

Source CHER Combined Physician Database.

TABLE 4-10

SUM OF WEIGHTS BY (RWP1) SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

	PPCIS			SMS			COMBINED		
	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (RWP1)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (RWP1)</u>	<u>N</u>	<u>Sum of Weights</u>	<u>Percent of Weights (RWP1)</u>
Specialty									
GP/FP	432	437	12.36	567	599	17.52	999	1,036	14.90
Internal Medicine	373	381	10.76	411	435	12.74	784	816	11.73
Medical Subspecialties	473	629	17.78	233	315	9.23	706	944	13.57
General Surgery	218	188	5.31	232	209	6.13	450	397	5.72
Surgical Subspecialties	844	733	20.73	579	509	14.90	1,423	1,242	17.87
Pediatrics	144	166	4.70	256	292	8.55	400	458	6.59
OB/GY N	271	278	7.86	257	271	7.92	528	549	7.89
Radiology	184	174	4.91	229	218	6.38	413	392	5.63
Psychiatry	207	201	5.69	180	171	5.00	387	372	5.35
Anesthesiology	216	209	5.91	171	168	4.91	387	377	5.42
Pathology	45	48	1.35	75	73	2.14	120	121	1.73
Emergency Medicine	74	78	2.21	108	109	3.19	182	187	2.69
Other Specialties	24	15	0.41	150	48	1.40	174	62	0.90
Region									
Northeast	726	786	22.22	770	800	23.40	1,496	1,585	22.80
North Central	780	724	20.48	821	745	21.81	1,601	1,470	21.14
South	1,236	1,194	33.79	1,180	1,140	33.34	2,416	2,334	33.57
West	763	831	23.51	677	733	21.45	1,440	1,564	22.49
Urbanicity									
Rural	845	583	16.48	638	431	12.61	1,483	1,013	14.58
Urban	2,660	2,953	83.52	2,810	2,987	87.39	5,470	5,940	85.42
Total	3,505	3,535	100.00	3,448	3,418	100.00	6,953	6,953	100.00

Source. CHER Combined Physician Database.

TABLE 4-I 1

SUM OF WEIGHTS (RWP2) BY SPECIALTY, REGION, AND URBANICITY: PPCIS, SMS, AND COMBINED

Specialty	PPCIS			SMS			COMBINED		
	N	Sum of Weights	Percent of Weights (RWP2)	N	Sum of Weights	Percent of Weights (RWP2)	N	Sum of Weights	Percent of Weights (RWP2)
GP/FP	432	440	12.70	567	596	17.08	999	1,036	14.90
internal Medicine	373	382	11.02	411	434	12.44	784	816	11.73
Medical Subspecialties	473	585	16.87	233	359	10.30	706	944	13.57
General Surgery	218	189	5.46	232	208	5.97	450	397	5.72
Surgical Subspecialties	844	671	19.37	579	571	16.38	1,423	1,242	17.87
Pediatrics	144	168	4.84	256	290	8.33	400	458	6.59
OB/GY N	271	291	8.40	257	257	7.38	528	549	7.89
Radiology	184	175	5.04	229	217	6.23	413	392	5.63
Psychiatry	207	206	5.95	180	166	4.75	387	372	5.35
Anesthesiology	216	217	6.25	171	160	4.59	387	377	5.42
Pathology	45	50	1.45	75	70	2.02	120	121	1.73
Emergency Medicine	74	78	2.25	108	109	3.13	182	187	2.69
Other Specialties	24	14	0.40	150	49	1.39	174	62	0.90
Region									
Northeast	726	766	22.11	770	819	23.49	1,496	1,585	22.80
North Central	780	716	20.66	821	754	21.61	1,601	1,470	21.14
South	1,236	1,173	33.85	1,180	1,161	33.29	2,416	2,334	33.57
west	763	810	23.38	677	754	21.61	1,440	1,564	22.49
Urbanicity									
Rural	845	570	16.46	638	443	12.71	1,483	1,013	14.58
Urban	2,660	2,896	83.54	2,810	3,044	87.29	5,470	5,940	85.42
Total	3,505	3,466	100.00	3,448	3,487	100.00	6,953	6,953	100.00

Source: CHER Combined Physician Database.

5.0 IMPLICATIONS

5.1 Survey Comparability

This study has compared the characteristics of two surveys of physicians, HCFA's 1988 Physicians' Practice Costs and Income Survey and AMA's 1989 Socioeconomic Monitoring System. The two surveys share many features in common, including the same sampling frame, administration of the surveys via three modes, and the same reference period for costs and incomes. Some of the means compared in Chapter 3 are fairly similar, for example, medical equipment expenses, malpractice premiums, and medical supply expenses. However, a number of the results are sufficiently different to raise questions about the comparability of the data from the two surveys. The items with the most significant differences include office expenses, aide expenses, and other expenses. Three factors may explain these differences:

- The method used to gather and then tabulate the data -- the PPCIS asked for practice-level expenses and then calculated per-physician shares (assuming equal allocation among physicians) while the SMS asked physicians to report their own share of expenses. It is unknown which method produces the most accurate results.
- Differential rates of item nonresponse which could systematically exclude certain types of practices -- the item nonresponse rates in the SMS are quite a bit higher than in the PPCIS, although it is unknown whether this results in systematic exclusion of certain types of practices.
- Structure and wording of the questionnaire -- for example, detailed expense reporting on deferred compensation and fringe benefits for aides in the PPCIS but not in the SMS; explicit reporting of physician employee expenses in the PPCIS but not in the SMS; and explicit probes for annual depreciation, interest, and lease expenses in the PPCIS but mention of mortgage in the SMS.

Our analysis revealed that the SMS has several possible limitations for future analysis of physician practice costs. First, it appears that physician employee expenses are significantly understated because they are not explicitly asked for in the "other" category, let alone in a separate category. Second, it appears that nonphysician employee expenses are considerably understated because deferred compensation and fringe benefits are omitted as separate questions. Third, the office expenses are higher in the **SMS, with** most of the difference

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occurring at the high end of the distribution. This suggests that physicians may be reporting their actual mortgage (as the question indicates) rather than annual depreciation/interest expenses.

We also encountered three limitations in the SMS public use file:

- the actual number of physicians in practices with more than 10 physicians was not reported (FTEMD=10);
- the actual number of nonphysician employees with more than 20 physicians was not reported (NONMDEMP=20); and
- detailed specialty categories were not reported; only 13 specialties were identified.

These restrictions have been imposed to protect confidentiality. Nevertheless, they preclude certain types of analyses that would be desirable (e.g., economies of scale). For the purpose of combining the samples, the PPCIS data have been adjusted to achieve comparability with the SMS.

5.2 Weighting the Combined Database

Whether the two samples should be cumulated in view of their differences is somewhat debatable. Nevertheless, we have developed the methodology for producing the weights for the combined sample. Eight weights have been calculated to provide a range of options for combining two probability samples with complex designs. The discussion in Chapter 4 defined and evaluated the options as follows:

- (1) Use relative weights rather than projection weights to more readily accommodate standard error calculation using computer packages.
- (2) Use “effective” sample sizes rather than raw totals to distribute the weights between the two samples.

The final decision is whether to use the PPCIS or the SMS targets (i.e., marginal distributions) and hence, whether to choose RWS2 or RWP2. The decision depends upon one’s assessment of the two surveys, with respect to sample design and original weighting methodology.

To assess the analytic impact of the alternative weights, means were produced for the analytic variables included in the combined database (Table 5-1). The first two sets of columns present means from the PPCIS and SMS (before combining) using the original survey weights (replicated from Table 3-2); the third set of columns shows the results using the PPCIS stratum targets (RWP2); and the fourth set of columns shows the results with the SMS stratum targets (RWS2).

Using net income (NETINC) as an example, the PPCIS mean is about \$163,000, while the SMS mean is about \$154,000. When the two samples are combined, the mean ranges between \$156,000 (using the SMS target weights) and \$161,000 (using the PPCIS target weights). The standard error on NETINC is considerably lower in the SMS sample than the PPCIS sample. The “combined” standard error is quite a bit lower than the PPCIS standard error, and about twice that of the SMS standard error.

Taking another example, malpractice expenses (EXPMAL), the means are quite comparable in the original samples (\$15,300 versus \$15,500). Likewise, the means in the combined database are similar, regardless of the target that is used to weight the observations. The standard errors, however, are reduced by combining the samples.

In general, using the SMS targets (RWS2) results in systematically lower estimates of mean expenses, work effort, practice size, and Medicare revenues. In some cases, the results are trivial and not even apparent at the second decimal. However, the mean for “other expenses” is 4 percent lower using the RWS2 weight compared with the RWP2 weight. What causes the differences in means using the alternative weights? The answer rests in the differences in the stratum targets between the two surveys. The PPCIS target gives relatively more weight to the higher-earning specialties and to physicians in urban areas, thus resulting in higher average expenses and net incomes. For example, the sum of weights for medical subspecialties is 13.57 percent in the PPCIS versus 7.68 percent in the SMS. For surgical subspecialties, the sum of weights is 17.87 percent in the PPCIS versus 16.32 percent in the SMS. Urban physicians also receive more weight when the PPCIS target is used (85.46 percent) compared with the SMS target (81.8 percent).

Combining the samples can have a demonstrable effect on reducing standard errors on selected variables including EXPMAL, as discussed above, EXPEQP, EXPOTH, HRSTOT,

HRSPC, HRSAD, FTEMD, NONMDEMP, and PERMED. Thus, combining the samples can increase the power of the analysis and thereby increase the ability to detect significant differences within small subgroups of physicians (such as women, those in larger practices, rural physicians, etc.).

5.3 Conclusion

The objectives of this study were twofold:

- (1) to compare the properties of two surveys of physicians, the PPCIS and the SMS; and
- (2) to develop methods to combine the two samples into a single database, by producing new weights.

As discussed above, we discovered a number of differences between the two surveys in terms of questionnaire wording, sample design, and nonresponse. Moreover, we observed significant differences in descriptive statistics between the two surveys on most of the key variables (Table 3-2). Nevertheless, when the two samples are combined, the standard errors are in general lower for the combined database than the original samples. Combining the data increases the power of the sample, thereby enabling the analyst to detect significant differences within the physician sample. Lower levels of aggregation would be possible, assuming the availability of physician descriptors from each of the samples. For example, the combined sample would contain more women physicians, rural physicians, and physicians in larger practices. More stable estimates of practice characteristics could be produced for these subgroups.

As part of this study, we were also able to develop new weights that could be used to combined the two samples if desired. However, we were unable to decide which stratum target to use -- the PPCIS or the SMS. Unfortunately, few benchmarks are available to ascertain which stratum target provides a more accurate reflection of the distribution of physicians in the population (especially in light of the eligibility criteria applied to the samples). Therefore, we opt not to recommend at this time which target to use. Instead, given

the experimental nature of this study, we suggest that further work is required to assess the analytic impact of the alternative weights (RWS2 versus RWP2).

Based on this study, we have identified a number of areas in which further research could be conducted to further understand the properties of the two surveys. The following list provides examples of methodological and analytic studies that could be pursued with the combined database:

Methodologic

- Compare the characteristics of nonrespondents for key variables. Is there selection bias in item response in the PPCIS or SMS?
- Extend the cumulation of the two databases to additional questions in an effort to determine comparability of other variables.
- Further explore sources of variation between the SMS and PPCIS on such expense questions as aide expenses, office expenses, and other expenses, including discussions with survey experts. Also explore characteristics of respondents that could effect mean values (such as geographic location, size of practice, and specialty).
- Further discuss the options for weighting the combined database using the two stratum targets. Such discussions, with SMS staff in particular, may provide further insight into the sampling and weighting procedures used by the AMA (which are not well documented in published sources).

Analytic

- Examine the properties of physician practice cost shares based on analysis of the two surveys individually and the combined database. What is the impact of the alternative weights on the results?
- Compare the work effort/productivity of physicians based on the two surveys and the combined database. To what extent does the **combined** database provide more power for detecting differences within subgroups of physicians?
- Analyze malpractice expenses for physicians based on the two surveys and the combined database. The two surveys appear to be extremely comparable on self-reported malpractice expenses.

Clearly, HCFA's current and future research agenda depends on accurate data on physician practice costs and incomes. The SMS survey provides a cost-effective source of data and moreover, the survey is conducted annually, permitting timely updates of baseline analyses. However, important questions remain about the properties of the PPCIS and SMS data, that should be explored further in future studies. Further analysis of the two surveys should be a high priority for HCFA.

**TABLE 5-I
COMPARISON OF MEANS AND STANDARD ERRORS: PPCIS, SMS, AND COMBINED DATABASE**

VARIABLE	DESCRIPTION	PPCIS			SMS			COMBINED WEIGHT = RWP2			COMBINED WEIGHT = RWS2			RATIO RWS2/RWP2
		N	MEAN	STANDARD ERROR	N	MEAN	STANDARD ERROR	N	MEAN	STANDARD ERROR	N	MEAN	STANDARD ERROR	
NETINC	Annual Net Income	3,218	\$163,209	\$8.451	2,597	\$153.724	\$2.076	5,815	\$160,769	\$4,836	5,815	\$156.461	\$4,474	0.073
EXPPER	Aide Expenses	2,944	\$54.336	\$1,786	1,858	\$48,441	\$1,252	4,802	\$52,857	\$1,283	4,802	351,324	\$1,288	0.971
EXPOFF	Office Expenses	3,056	\$21,637	\$688	1,887	\$34.046	\$957	4,943	\$26.649	\$585	4,043	326.600	\$606	0.998
EXPMAL	Malpractice Expenses	3,020	\$15.291	\$302	2,690	\$15,490	\$319	5,710	\$15.536	\$229	5,710	\$15.221	\$224	0.980
EXPSUP	Medical Supply Expenses	2,874	\$17,318	\$3,045	1,805	\$14,498	\$566	4,679	515.753	\$1,369	4,670	315.706	\$1,407	0.997
EXPEQP	Medical Equipment Expenses	2,700	36.446	\$526	1,762	\$6,866	\$351	4,462	\$6,667	\$333	4,462	\$6,520	\$331	0.978
EXPTH	Other Expenses	3,075	\$27.055	\$768	1,787	\$17,075	\$766	4,862	323.675	3579	4,862	322,707	\$534	0.959
EXPTOT	Total Expenses	2,562	\$143.358	\$5,282	1,635	\$135.360	\$2,866	4,197	\$141,498	\$3,233	4,197	\$138,305	\$3,318	0.977
HRSTOT	Hours per Week- Total	3,501	58.03	0.29	3,336	59.93	0.31	6,837	59.20	0.22	6,837	58.95	0.21	0.996
HRSPC	Hours per Week- Patient care	3,497	52.29	0.28	3,344	54.93	0.30	6,841	53.82	0.21	6,841	53.60	0.20	0.996
HRSAD	Hours per Week- Administrative	3,500	5.74	0.11	3,401	5.06	0.10	6,901	5.40	0.07	6,901	5.38	0.07	0.996
FTEMD	# FTE physicians	3,504	3.23	0.05	3,188	3.19	0.05	6,692	3.23	0.04	6,692	3.18	0.04	0.985
NONDEMP	# FTE Non-physicians	3,480	7.12	0.12	3,115	6.38	0.12	6,595	6.82	0.09	6,595	6.67	0.08	0.878
PERMED	Percent revenues Medicare	3,352	30.17	0.35	2,740	27.99	0.38	6,092	29.48	0.26	6,092	28.89	0.25	o.sao

NOTES: Expense6 are calculated on a per physician basis.
Survey weights have been applied; Standard errors are corrected using SUDAAN.

SOURCES: 1988 PPCIS and 1989 Core SMS.

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Gonzalez, M.L., and D.W. Emmons, Editors, Socioeconomic Characteristics of Medical Practice, 1989, American Medical Association, 1989.

Thalji, et al., 1988 Physicians' Practice Costs and Income Survey: Final Report and User's Manual, NORC, HCFA Contract No. 500-88-0045, January 1991.

APPENDIX A

NONRESPONSE TABLES

TABLE A-I
NON-RESPONSE RATES FOR COMPONENTS OF COMBINED DATABASE VARIABLES: PPCIS

<u>GENERIC VARIABLE LABEL</u>	<u>VARIABLE</u>	<u>(1)</u> TOTAL POSSIBLE VALID RESPONSES	<u>(2)</u> TOTAL POSSIBLE VALID RESPONSES	<u>(4)</u> MISSING VARIABLES			<u>(8)</u> TOTAL MISSING VALUES (5+6+7)	<u>(9)</u> PERCENT MISSING VALUES (8 / 3)	
				<u>(3)</u> TOTAL RESPONSES	<u>(4)</u> VALID SKIPS	<u>(5)</u> .D			<u>(6)</u> .R
Net income	NET	3,505	3,273	0	55	4	228	232	6.62%
Nonphysician Payroll Expense	18	3,085	2,973	420	40	85	27	112	3.63%
	18A	3,085	2,586	420	82	83	416	499	16.18%
	18B	3,085	2,638	420	97	87	360	447	14.49%
Building Expense	19A	3,056	3,044	449	14	2	10	12	0.39%
	19B	3,056	3,037	449	95	9	10	19	0.62%
	19D	3,076	3,026	429	67	29	21	50	1.63%
Medical Liability Expense	23	3,086	3,050	419	30	29	7	36	1.17%
Medical Materials/Supplies Expense	22	3,086	3,007	419	133	39	40	79	2.56%
Medical Equipment Expense	21	3,086	2,990	419	290	38	58	96	3.11%
Other Expenses N.E.C.	17	3,079	2,962	426	19	28	89	117	3.80%
	17A	3,079	2,904	426	29	30	145	175	5.68%
	17B	3,079	2,904	426	36	29	146	175	5.68%
	24	3,086	3,025	419	158	38	23	61	1.98%
	25	3,086	3,020	419	81	31	35	66	2.14%
	26	3,086	3,030	419	126	39	17	56	1.81%
Total Hours per Week	9A	3,505	3,503	0	2	0	2	2	0.06%
Hours per Week, Administrative	9B	3,505	3,505	0	5	0	0	0	0.00%
Total # of FTE MDs	12A	3,505	3,504	0	0	1	0	1	0.03%
	12B	3,505	3,496	0	5	2	2	9	0.26%
Total # of Non-MD FTEs	14	3,505	3,496	0	7	17	1	9	0.26%
Percent Medicare Patients	38B	3,505	3,492	0	140	10	3	13	0.37%
Specialty	SPECIAL, SELF	3,505	3,505	0	0	0	0	0	0.00%
Board Certification	BOARD1	3,505	3,505	0	0	0	0	0	0.00%
Multispecialty Group	MULTSPEC	3,505	3,505	0	0	0	0	0	0.00%
Employment Status	5A	3,505	3,505	0	0	0	0	0	0.00%

Note: .D = Don't know
.R = Refused

Source: 1988 PPCIS

TABLE A-2
NON-RESPONSE RATES FOR COMPONENTS OF COMBINED DATABASE VARIABLES: SMS

GENERIC VARIABLE LABEL	VARIABLE	(1)	(2)	(3)	MISSING VALUES			(8)	(9)
		TOTAL POSSIBLE VALID RESPONSES	TOTAL RESPONSES	VALID SKIPS	OTHER	.D	.R	TOTAL MISSING VALUES (5+6+7)	PERCENT MISSING VALUES (8/3)
Net Income	NETINC	3,440	3,425	23	17	221	590	020	24.2%
Nonphysician Payroll Expense	EXPPER	3,440	2,055	593	2	490	505	997	34.9%
Building Expense	EXPOFF	3,440	2,055	593	2	479	407	960	33.9%
Medical Liability Expense	EXPMAL	3,440	3,439	9	3	299	447	749	21.0%
Medical Materials/Supplies	EXPSUP	3,440	2,055	593	2	542	506	1,050	36.8%
Dep./Lease/Rent Med. Equipment	EXPEQP	3,440	2,055	593	2	504	507	1,093	30.3%
Other Expnses N.E.C.	EXPOTH	3,440	2,055	593	3	557	500	1,068	37.4%
Total Expenses	EXPTOT	3,440	1,635	1,013	0	0	0	0	0.0%
Total Hours Per Week	HTOT	3,440	3,336	112	0	0	0	0	0.0%
Hours Per Week, Administrative	HNPC	3,440	3,440	0	0	44	3	47	1.4%
Hours Per Week, Patient Care	HPC	3,440	3,344	104	0	0	0	0	0.0%
Total # of FTE MDs	DOCNUM	3,440	3,196	252	0	8	0	0	0.3%
Total # of FTE non-MDs	NONMDEMP	3,440	3,196	252	0	01	0	01	2.5%
Percent Medicare Patients	MEDICARE	3,440	3,170	270	0	376	62	430	13.0%
Specialty	SP13	3,440	3,440	0	0	0	0	0	0.0%
Board Certification	CERT	3,440	3,440	0	0	0	0	0	0.0%
Multispecialty Group	SAMESPEC	3,440	1,712	1,736	0	1	1	2	0.1%
Employment Status	EMPL	3,440	3,440	0	0	0	0	0	0.0%

Note: .D = Don't know
.R = Refused

Source: 1909 Core SMS