TRENDS IN HMO PENETRATION IN RURAL AREAS

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Thomas C. Ricketts, III, PhD, MPH

Rebecca T. Slifkin, PhD

Karen D. Johnson-Webb, MA

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TRENDS IN HMO PENETRATION IN RURAL AREAS

This study analyzes the 1993 National Directory of HMOs to determine the extent of HMO penetration in rural areas. Two specific questions are addressed: 1) how do the patterns of penetration differ across HMO model types, and 2) what are the characteristics which distinguish rural counties which are served by HMOs from those which are not. Although a majority of rural counties are in HMO service areas, substantially fewer are served by non-IPA models. Access to HMO services is found to decrease as county population density lessens, and adjacency to metropolitan areas is an important predictor of inclusion in a service areas.

TRENDS IN HMO PENETRATION INTO RURAL AREAS

Introduction

Since the popularization of the concept of health maintenance organizations (HMOs) during the 1970s, there has been concern that this approach to financing and organizing health services would not fit in the rural environment (Appel and Schlenker, 1976). Although from the beginning there have been proponents of the idea of HMOs providing increased access to care in rural communities (Hillis and Miller, 1974; Less, 1975; Ross, 1975), an early analysis of the potential for rural HMOs concluded that the prepaid managed care concept was not feasible in rural places from a competitive standpoint (Cattani, Drymalski, Flegar, McCord, and Muscat, 1975). Despite the long-standing and continuing existence of HMOs located completely in rural areas (Nycz, Wenzel, Lohrenz, and Mitchell, 1976; Korczyk and Witte, 1992) there remains concern among rural health planners as it has become evident that the prevailing trend in medical economics is toward a complete dominance of the market by managed care systems.

Unlike traditional indemnity plans, some types of HMOs (such as staff models) require a threshold number of subscribers to support the capital needs of the staffed delivery system or to provide some actuarial basis for distributing risk. Because of this need, there has been concern that HMOs may not represent viable health care delivery systems in many rural areas of the United States, a conclusion that was echoed when the promise of managed competition for rural areas was assessed (Kronick, Goodman, Wennberg, and Wagner, 1993). This article examines the expansion of HMO service areas into rural areas geographically and by type of HMO. The study attempts to answer two questions: first, how do the patterns of penetration differ across HMO models (i.e. staff, IPA, etc.), and second, what are the characteristics which distinguish rural counties which are served by HMOs from those which are not? The analysis is intended to guide policy makers who are assessing the potential for managed care to improve access and affordability for all Americans no matter where they live.

Background

Rural prepaid systems were in place as early as 1842 (Ross, 1975) and one of the earlier examples of the modern concept of pre-payment was established in a rural area by Michael Shadid and the Farmers Union in Elk City, Oklahoma (Starr, 1982). Rural health cooperatives were set up in the 1930s with the support of the Farm Security Administration, enrolling as many as 600,000 low-income people. These attempts to meet the health care needs of rural populations were abandoned for reasons that kept pre-paid systems from emerging throughout the period prior to 1970, primarily opposition from organized medicine. In a paper which outlined the development of HMOs in rural areas, Jon Christianson emphasized both the exceptional nature of these HMOs and the very small number of persons actually enrolled in the few operating rural HMOs (Christianson, 1989).

There is no single authoritative source that tracks the penetration of managed care programs into rural places. States individually license and monitor companies providing health insurance (including managed care), and may or may not require detailed geographic information on markets to be reported. Christianson et al. (1986) used a 1984 census of HMOs conducted by InterStudy, Inc. to assess the degree of HMO penetration in rural counties, and to briefly discuss the change in penetration between 1981 and 1984. The authors identified 118 HMOs serving rural areas in 34 states, a 50% increase from an earlier survey. The Christianson et al. analysis indicated the number of HMOs and counties being served but did not differentiate the penetration of staff versus other types of managed care organizations.

The Group Health Association of America does produce an annual National Directory of HMOs which contains basic descriptive information provided by each health maintenance organization, including organizational type and service area. This data source was used by Serrato and Brown (1992) in their analysis of HMO coverage for rural Medicare beneficiaries. Out of the 592 HMOs which were listed in 1990, the authors identified 301 HMOs which had at least one rural (nonmetropolitan) county in their service area and 11 which served only nonmetropolitan counties. However, the study was focused on Medicare plans and did not fully examine all rural HMOs. Serrato and Brown did find that

there was low overall penetration of Medicare coverage into rural areas and that this penetration was selective; Medicare enrollees were more likely to be offered coverage by HMOs serving rural areas with both higher payment rates under the Adjusted Average Per Capita Cost (AAPCC) system and more demand and supply of medical resources.

In a Congressional Research Service paper discussing managed competition in rural areas, brief descriptive statistics using data from the 1993 Group Health Association of America (GHAA) directory of HMOs were presented (Fuchs, 1994). The GHAA annually surveys the industry and identified a total of 541 HMOs which were in operation in 1992. Of these, 56 (10.3%) were staff models, 67 (12.4%) were groups, 87 (16.1%) were networks, and 331 (61.2%) were IPAs (GHAA, 1993a). This listing is by primary type; overall, 6% of all HMOs are a mixture of types, with 49% of staff, 28% of network, 13% of group and 8% of IPA HMOs mixed with some other form. Fuchs did not, however, examine the geographic distribution of HMOs. The Fuchs review also cited an unpublished 1992 study conducted by Doug Wholey which assessed adjacency as a predictor of inclusion of a rural county in an HMO service area. His results indicated that HMOs served 845 rural (nonmetropolitan) counties and that nonmetropolitan counties adjacent to metropolitan areas were almost 2.5 times as likely to be included in an HMO market area as were counties not adjacent to metropolitan areas.

Even though the potential for rural HMOs remains an open question (Serrato and Brown, 1992), the United States Congress encourages policies to support the development of rural managed care systems. This is evidenced by the funding for managed care demonstrations in rural America which is included in appropriations for the U.S. Agency of Health Care Policy and Research (AHCPR) (US Senate, 1994). That program has funded five projects intended to demonstrate the advantages of managed care for rural communities which, in the words of the Administrator of the AHCPR, Clifton Gaus, "...are of proven value and available in metropolitan areas, but are frequently unavailable to rural populations." (AHCPR, 1994)

Data and Methods

This study used the same method employed by Serrato and Brown (1992) of abstracting

information from the GHAA National Directory of HMOs (GHAA, 1993). The name, type, age, Medicare and Medicaid coverage and county-defined service area for each HMO were entered into a database. Where the service areas were not listed as counties, the HMO was contacted and counties identified and entered. Where cities were identified, the county or counties which included the city were listed as being the service area. Observations for Alaska and Hawaii were dropped from the analysis file, the former because it is treated as one county, and the latter because of its unusual health care environment.

Variables representing county characteristics were drawn primarily from the Area Resource File and special files provided by the Office of Shortage Designation in the Bureau of Primary Health Care, HRSA, HHS. The Area Resource File is maintained by the U.S. Bureau of Health Professions to track health professions supply and trends and includes numerous county-level descriptors drawn from other databases including the Census, the American Medical Association Physician Masterfile, the American Hospital Association Annual Survey, Medicare and Medicaid Files, and other sources that compile county-level data. These files were linked to the HMO inventory file through common Federal Information Processing Standard (FIPS) Codes.

For the purpose of identifying nonmetropolitan counties as well as assigning degree of "rurality" to them, this study made use of a county-level classification system developed in the U.S. Department of Agriculture called the "Urbanicity Code" or Parker-Ghelfi system (Ghelfi, Cromartie, Lahr, and Parker, 1993). This system is particularly appropriate here, because in addition to considering the population of the county itself, it also differentiates nonmetropolitan counties according to their relationship to larger metropolitan areas, which allows the analysis to consider both size and adjacency as factors affecting market choices. Counties are categorized into six levels: large metropolitan, small metropolitan, nonmetropolitan adjacent to large metropolitan, nonmetropolitan adjacent to small metropolitan, nonmetropolitan non-adjacent with a city >10,000 population, and nonmetropolitan non-adjacent with no city >10,000. The classification system depends upon 1990 census data and 1990 Office of Management and Budget classification of counties. Since the classification of metropolitan and nonmetropolitan counties is a continuous process, the total number of counties listed as

nonmetropolitan may not agree with extant listings unless the dates of the classification system coincide.

Descriptive statistics across county types, HMO model types, and state were generated using the SAS© (version 6.1) data management and statistical system. Maps of the locations of the HMO service areas and the change in those service areas were created using the MapInfo© (version 3.0) mapping software.

The geographic and cartographic examination of the distribution of the HMOs was supplemented by a multivariate regression analysis in order to identify those county characteristics which predict inclusion in a HMO service area. Two versions of a logistic regression with the county as the unit of analysis were estimated using the STATA© (version 3.1) statistical software. The first model estimated the probability of inclusion in any HMO service area, and the second model estimated the probability of inclusion in staff, group, or network HMOs, with IPA models excluded.

To assess the association between rurality and the probability of being in an HMO service area, dummy variables for each urbanicity code were included in the model, leaving "large metropolitan" out as the reference category. It was also hypothesized that counties which were more populous, richer, had more medical resources, and were adjacent to more urban counties were more likely to be included in an HMO service area. Therefore, additional independent variables included: designation as a part- or whole-county Health Professional Shortage Area (HPSA) at any time between 1978 and 1990 or designation as a chronic HPSA (with never a HPSA as the comparison category); the county's Medically Underserved Area (MUA) index in 1992; the population as reported by the Census in 1990 (natural log); the population density in 1990 (natural log); the mean per capita income for the county in 1990 (natural log); the percentage of workforce unemployed in 1990 (natural log); the percentage of the population non-white (natural log); and the population in 1990 of the largest adjacent county (natural log). The inclusion of the population of the largest adjacent county was considered to account for multi-county market influences, with the population standing in for potential complexity of the market and of HMO activity.

Although it would have been desirable to also include measures of provider and hospital bed

availability, these variables were found to be endogenous to the model. Therefore, a reduced form model was estimated. A final estimation problem was the inability to control for differences in state-level policies. Differing degrees of regulation, oversight, or support for HMOs might have caused a variable level of penetration across individual states. This could potentially be controlled by using individual state dichotomous variables. However, some states have all counties in HMO service areas, and those states would be eliminated from the analysis due to perfect prediction. In an attempt to control for the differing degrees of receptivity towards HMOs across states, a final dummy variable was included which indicated whether the county was in a state with three or more operating HMOs in 1980. Serrato and Brown (1992) found that the AAPCC rate was a strong indicator of a county having a Medicare HMO option. However, the AAPCC rates are "highly volatile" and potentially not a stable factor in market decisions (PPRC, 1995), therefore the AAPCC rate was not included in the model.

Results

The inventory of HMOs indicated that, of the 544 total HMOs included in the analysis file, 218 (40.1%) were located strictly in metropolitan counties and did not claim nonmetropolitan counties in their service areas; only five (<1%) were serving solely nonmetropolitan counties and 321 (59%) served both metropolitan and nonmetropolitan counties. The nonmetropolitan distribution of HMOs in 1992 is depicted in Figure 1. The darker shaded areas identify nonmetropolitan counties that are not included in the service areas identified by HMOs in 1992. The pattern of markets indicates difference based on state regulation, population density and regional HMO market activity.

Table 1 lists the numbers of nonmetropolitan counties included in HMO service areas by state and type of HMO. The table illustrates the widespread penetration of the IPA model and the very local and concentrated penetration of the staff model. Group/network and mixed models are present in intermediate numbers of counties. Figures 2a and 2b break the distribution down by type of HMO and the number of competing HMOs in each nonmetropolitan county. Again, there are marked state by state differences in distribution of HMOs and the degree of potential competition among HMOs serving nonmetropolitan areas. Figure 2b reiterates the point made by Table 1 that staff and group/network

HMOs are present in a limited number of nonmetropolitan counties and concentrated in a few states including Ohio, Tennessee, Wisconsin, California, and Oregon.

Although HMOs have been extant for more than 20 years and were originally targeted for rural areas in the enabling federal legislation, the spread into rural areas is considered to be a recent phenomenon (Knight, 1994; Lawrence, 1994; Christianson et al., 1986). Figure 3a and 3b indicate that it is the older HMOs which include nonmetropolitan counties in their service and market areas rather than the newer organizations. These findings suggest that a substantial period of time elapses between the establishment of a plan in metropolitan areas and the subsequent spread of coverage to the adjacent rural counties.

Table 2 uses the Parker-Ghelfi Urbanicity Codes classification system to examine patterns of HMO penetration by nonmetropolitan county location and city size. It is apparent that staff models, which are the more complex and resource-dependent type of HMOs, are an urban phenomenon. That pattern does not hold as well for group and network model HMOs, where there is penetration of 11% to 32% in the rural classification counties. The IPA HMOs have the greatest level of penetration across the nonmetropolitan county types. Even the smallest and most isolated counties are penetrated over 40%, which, though relatively less than the more adjacent and larger counties, indicates that the very small and remote counties are being considered and included in HMO markets. The nearly uniform decline in market penetration by urbanicity code indicates that this classification system clearly captures market complexity.

Recently, the federal and state governments have turned more often to managed care in an attempt to stem the rise in costs in the Medicare and Medicaid programs. The geographic distribution of HMOs which offer coverage for Medicare and Medicaid enrollees is mapped in Figure 4. HMOs which offer coverage to both Medicare and Medicaid enrollees showed a strong state-specific distribution. Inclusion of Medicare beneficiaries showed a somewhat more targeted pattern with adjacency to metropolitan areas clearly important to the decision to serve Medicare enrollees. Table 3 shows the pattern of geographic inclusion of Medicare and Medicaid beneficiaries by county type. As with the distribution of model types, nonmetropolitan counties which are more populous and closer to

the metropolitan areas are more likely to offer coverage to Medicare and Medicaid enrollees.

The results of the reduced form logistic regressions are summarized in Table 4. The two models, one estimating the probability of being in any HMO service area and one estimating the probability of service by a non-IPA HMO are displayed side by side to allow for contrast between the two estimations. In general, the individual model results agreed with the informal hypotheses presented earlier but with some important exceptions. In both models, all classes of county urbanicity had a lower probability of being in an HMO service area than the largest metropolitan counties, the reference or omitted category. Population was not significant but population density was a positive and significant predictor of service area inclusion. County economic characteristics were not significant, with the exception of unemployment, which was significantly associated with the risk of being in a non-IPA HMO service area. However, the proportion of non-white county population was negatively correlated with the county being in an HMO service area. As expected, the greater the population in the largest adjacent county, the greater the odds that a county would be included in a service area.

The association between the dependent variable and the dummy variable which identified states that had early, relatively extensive experience with HMOs was particularly interesting. Having this experience was significantly associated with decreased odds of being part of the service area of any HMO, but the odds of being in a service area of a staff, group, or network HMO were increased. Also unexpected was the result that counties that are or were a HPSA were more likely to be in an HMO service area (significant for all types of HMOs, only significant for non-IPA in the counties which had persistent or chronic designation as HPSAs).

Conclusions

The variable penetration of HMOs into nonmetropolitan counties reflects differences in state regulatory environments and the importance of state boundaries in HMO market decisions. Companies which must meet the requirements of each state insurance regulator see differences in market opportunities from state to state. There are also regional variations within and across states that point to problems that are potentially more related to market potential than regulatory issues in some

nonmetropolitan areas. Overall, it is clear that the managed care industry sees a benefit to serving many nonmetropolitan communities; the inclusion of a substantial number of nonmetropolitan counties in more than one HMO service area indicates that the direst prediction that all nonmetropolitan areas will not benefit from competition-based financing systems (Kronick et al., 1994) is not the case. Still there are problems for rural communities when it comes to being included in the managed care market. The difference in penetration when IPAs are excluded from the analysis is stark. Given that the structure and operation of HMOs differ widely according to their model type (Luft, 1981), with staff model HMOs requiring substantial capital and personnel investment, group or network HMOs requiring a range of infrastructure, and Independent Practitioner (IPA) or Preferred Provider Organization (PPO) forms requiring minimal capital or organizational structure, the lack of penetration of non-IPA HMOs into rural areas is not surprising. The finding does imply that while many rural areas may participate in managed care systems, choice of model type may be limited. The least populous and most remote counties are not at all likely to be included in HMO markets. The two most rural classes of counties include 22.3 million people; 55% of those (12.3 million) are in counties which are not served by HMOs. An additional 5.5 million people live in the other two nonmetropolitan county classifications and were not included in any HMO service area in 1992. If managed care is the guarantor of reasonable cost savings, then 17.8 million rural Americans may not be able to benefit from this market-driven advantage.

The process of selection of rural counties for inclusion in HMO markets is not necessarily clarified by the multivariate analysis described above. It makes sense that more populous and wealthier areas are more likely to be targeted as markets for an insurance product. But the general propensity for those counties to be more often identified as areas with shortages of professionals doesn't fit the notion of a desirable market. When that factor is combined with the negative relationship between HMO market inclusion and the proportion of the population which is non-white, it might seem that the inclusion of underserved areas may be selective. When HMOs make their market plans they may avoid areas with fundamental problems with their social and economic make-up, but may serve areas which have effective demand for services which might be met by providers in adjacent counties.

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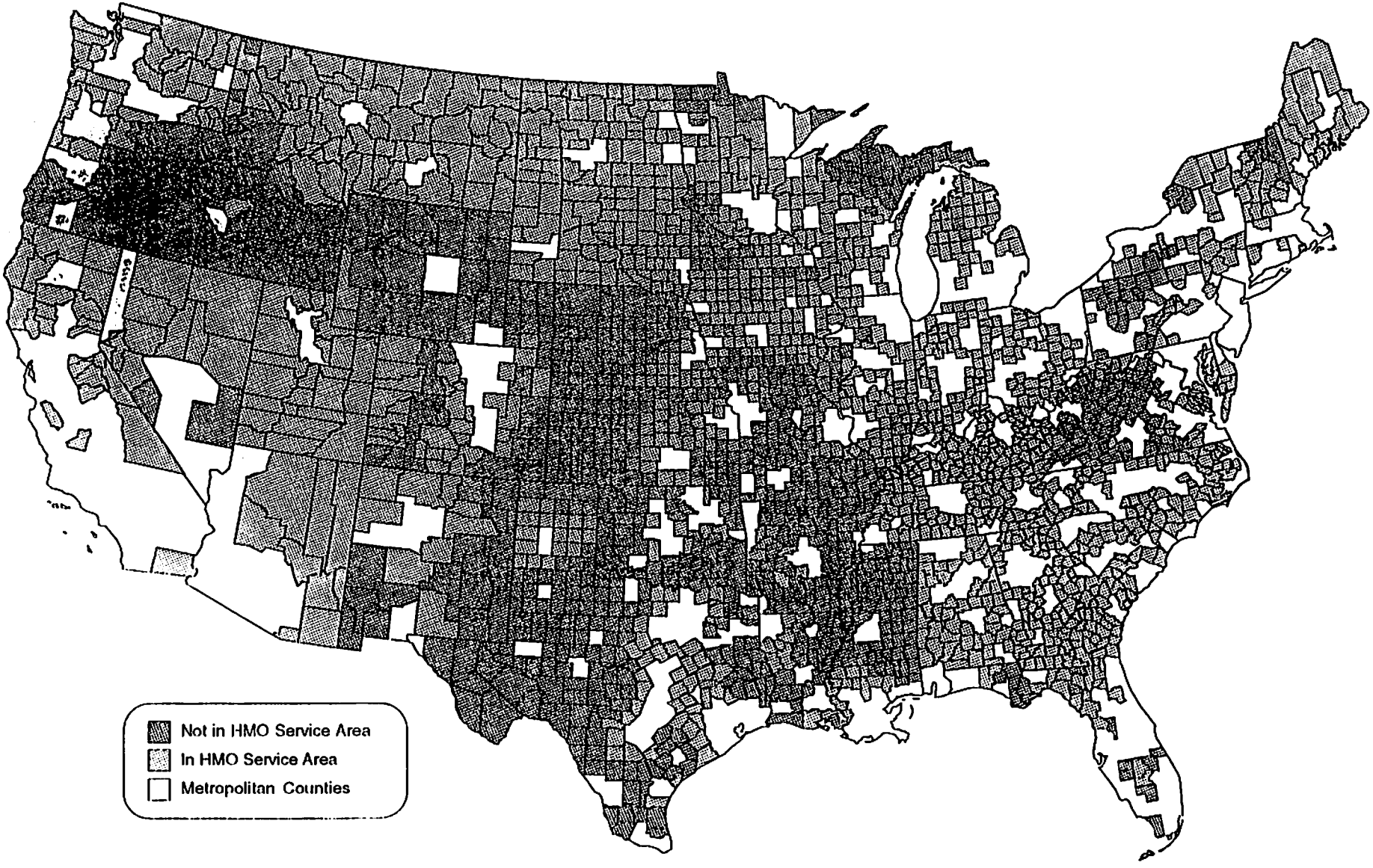
Figure 1

NONMETROPOLITAN HMO SERVICE AREAS, 1992

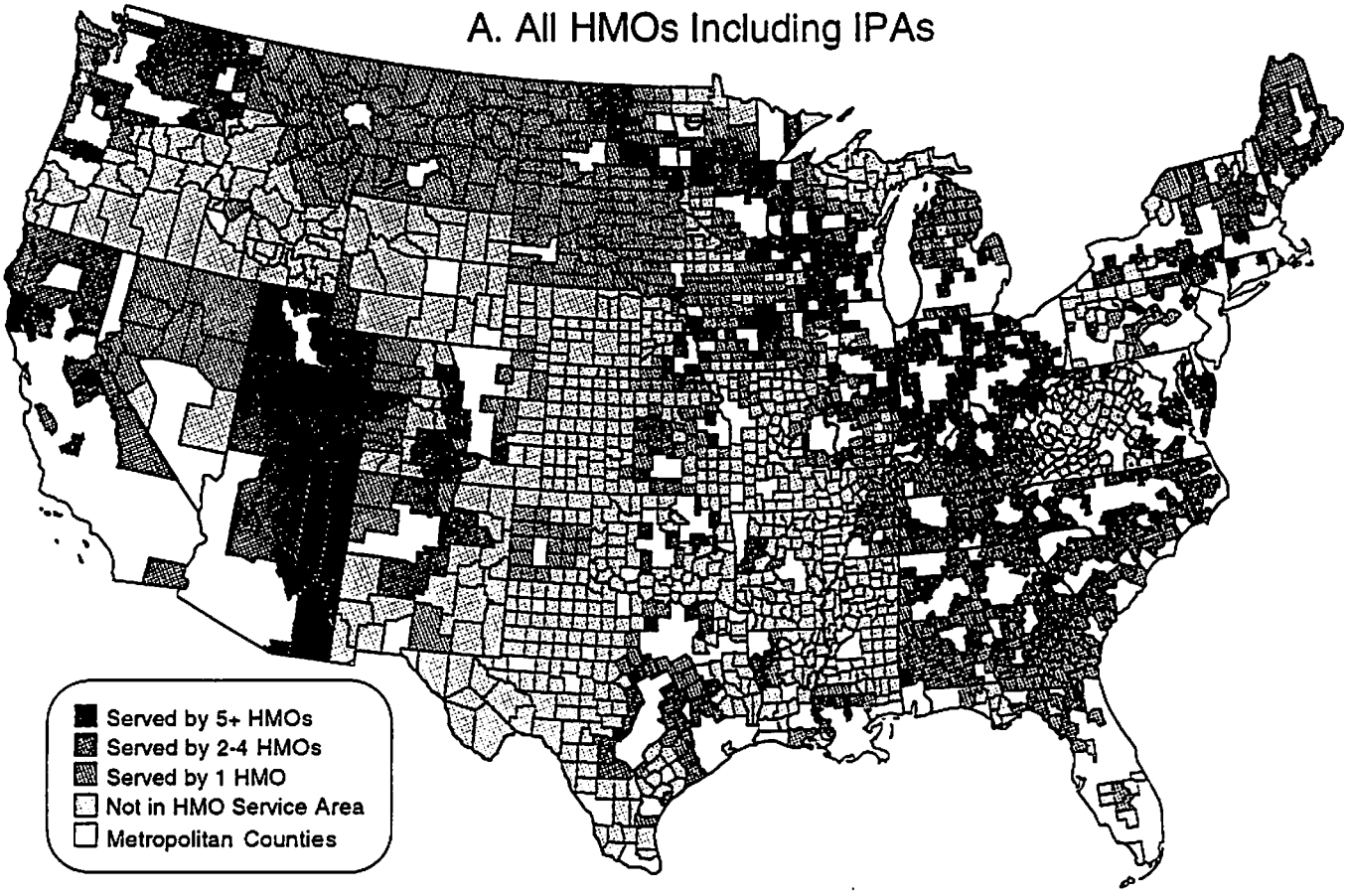


Source: GHAA National Directory of HMOs, 1993.
Produced by: NC Rural Health Research Program, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

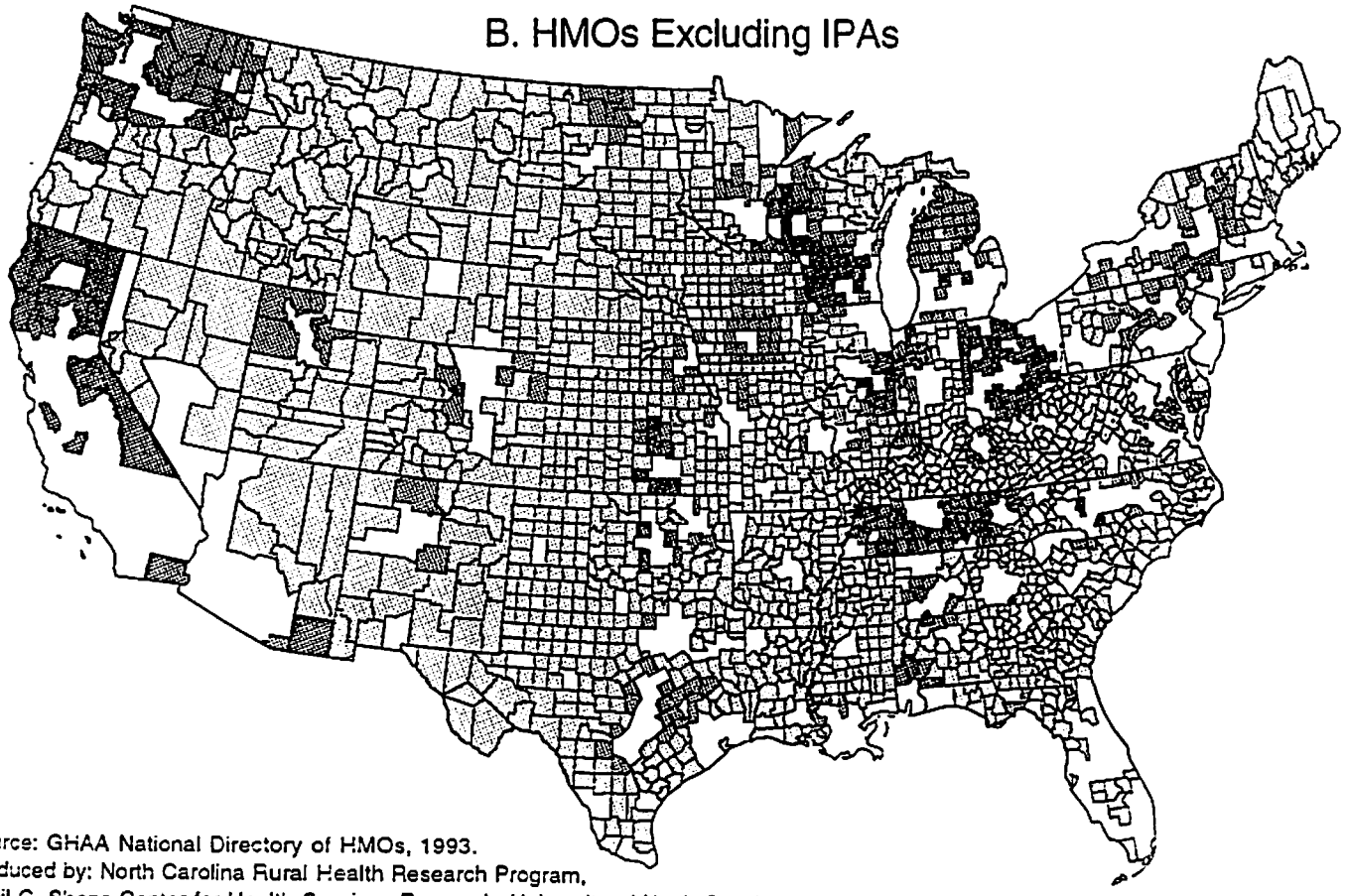
Figure 2

NONMETROPOLITAN HMO SERVICE AREAS, 1992

A. All HMOs Including IPAs



B. HMOs Excluding IPAs

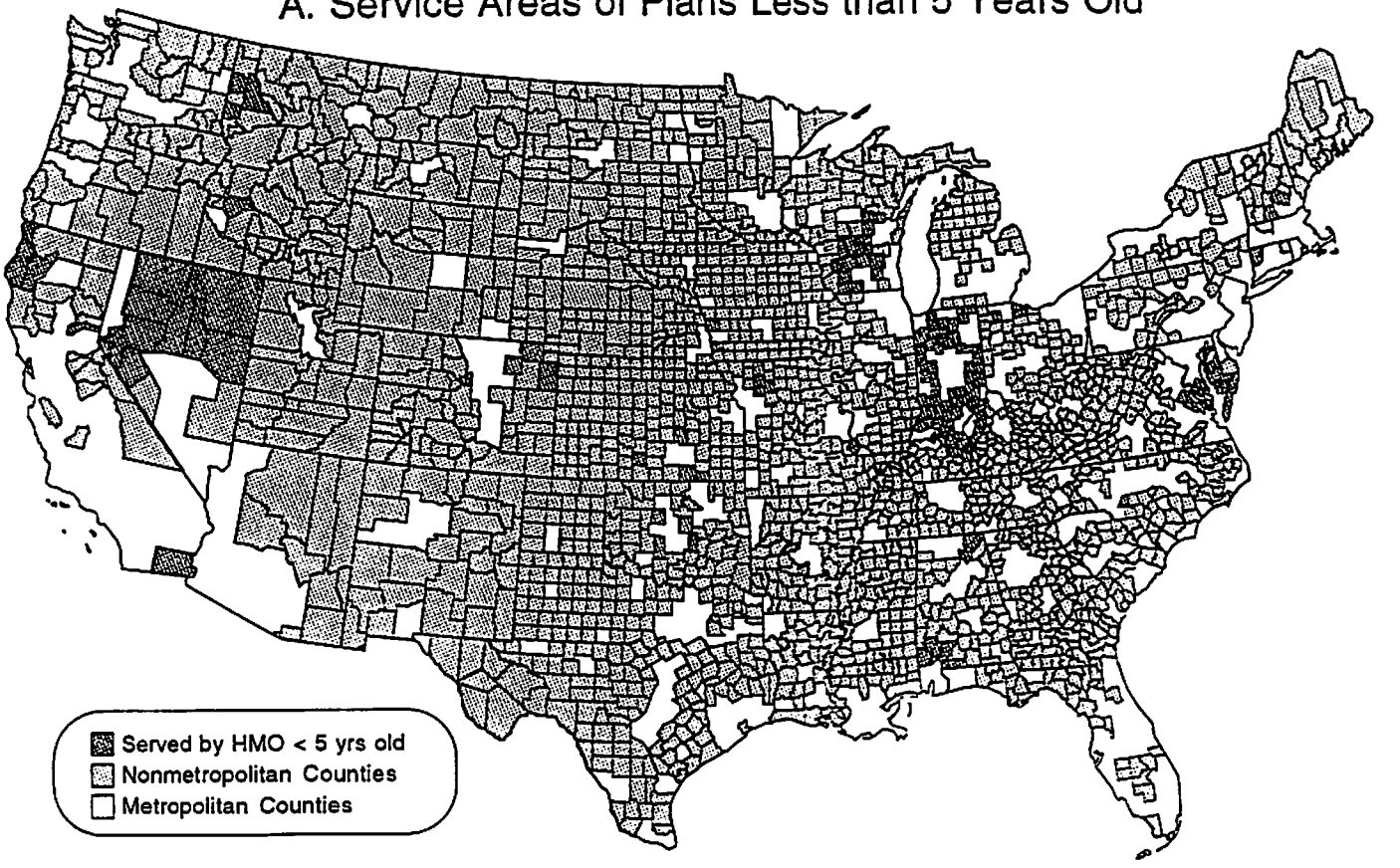


Source: GHAA National Directory of HMOs, 1993.
Produced by: North Carolina Rural Health Research Program,
Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

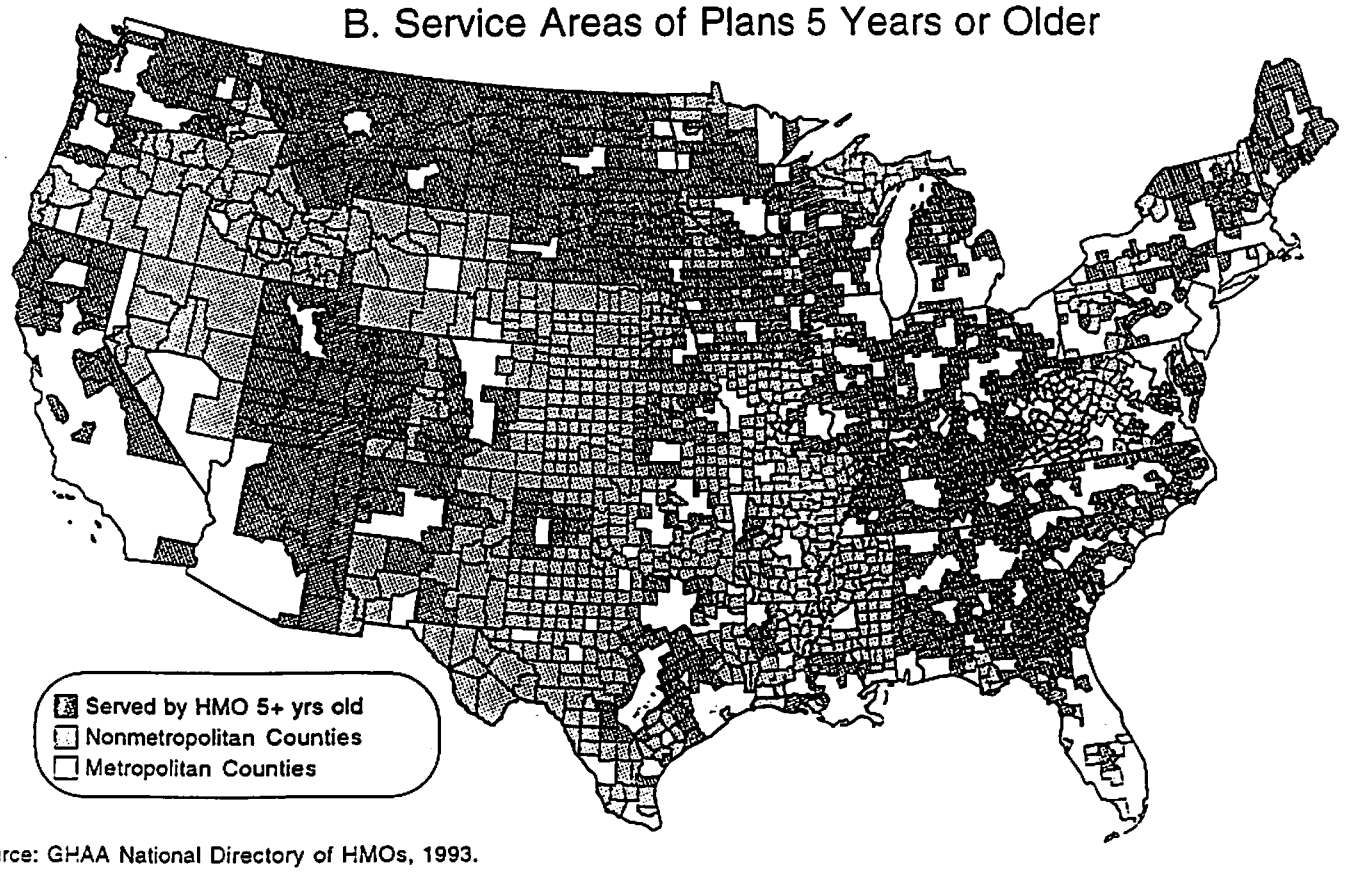
Figure 3

NONMETROPOLITAN HMO SERVICE AREAS,1992

A. Service Areas of Plans Less than 5 Years Old



B. Service Areas of Plans 5 Years or Older

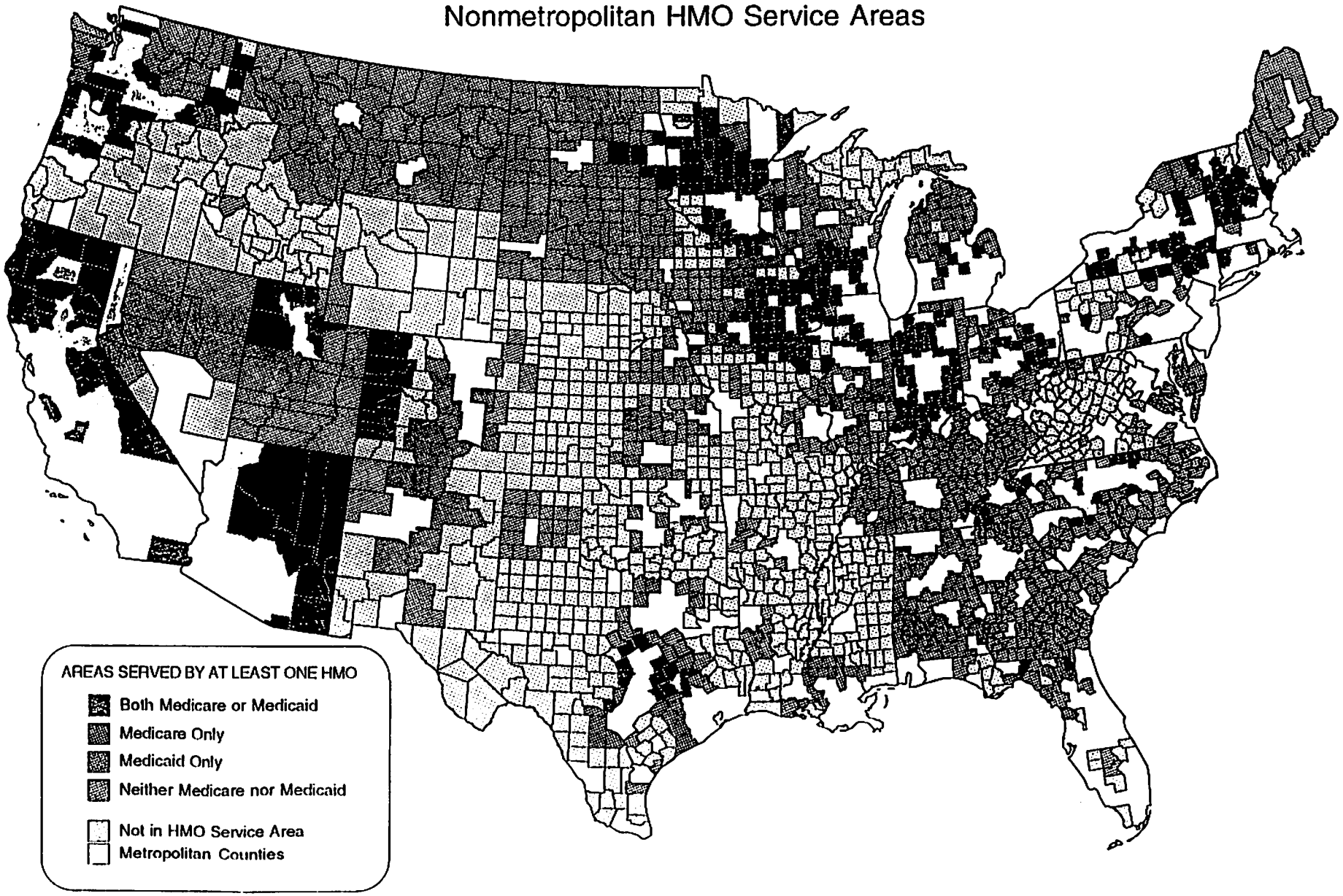


Source: GHAA National Directory of HMOs, 1993.
Produced by: NC Rural Health Research Program, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Figure 4

HMO COVERAGE FOR MEDICARE AND MEDICAID ENROLLEES, 1992

Nonmetropolitan HMO Service Areas



Source: GHAA National Directory of HMOs, 1993.
Produced by: NC Rural Health Research Program, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.
Revised June 1995.

Table 1
Rural Counties[1] Included in HMO Service Areas, by State and Model Types

State	Total Rural Counties (N)	Rural Counties Included in Service Area of: Staff (N)	Staff (%)	Group/Network (N)	Group/Network (%)	IPA (N)	IPA (%)	Mixed Model (N)	Mixed Model (%)
Alabama	46	2	4	11	24	46	100	5	11
Arizona	9	0	0	2	22	9	100	4	44
Arkansas	64	0	0	0	0	7	11	0	0
California	24	0	0	24	100	12	50	9	38
Colorado	53	0	0	7	13	29	55	5	9
Connecticut	2	1	50	0	0	2	100	0	0
Delaware	1	0	0	0	0	1	100	1	100
Florida	33	0	0	1	3	18	55	3	9
Georgia	117	0	0	1	1	117	100	0	0
Idaho	42	0	0	0	0	5	12	3	7
Illinois	74	6	8	16	22	37	50	24	32
Indiana	55	1	2	14	26	55	100	55	100
Iowa	89	0	0	32	36	65	73	0	0
Kansas	96	0	0	10	10	23	24	3	3
Kentucky	98	0	0	10	10	98	100	6	6
Louisiana	40	0	0	5	13	15	38	5	13
Maine	13	0	0	0	0	13	100	1	8
Maryland	9	0	0	9	100	9	100	0	0
Massachusetts	3	0	0	1	33	2	67	1	33
Michigan	58	0	0	35	60	20	35	6	10
Minnesota	69	0	0	8	12	0	0	43	62
Mississippi	75	0	0	0	0	4	5	0	0
Missouri	93	3	3	4	4	9	10	0	0
Montana	54	0	0	0	0	54	100	0	0
Nebraska	87	0	0	1	1	21	24	5	6
Nevada	14	0	0	0	0	12	86	0	0
New Hampshire	7	0	0	0	0	5	71	5	71
New Mexico	26	0	0	2	8	9	35	0	0
New York	24	2	8	7	29	19	79	7	29
North Carolina	65	0	0	7	11	65	100	0	0
North Dakota	49	0	0	7	14	49	100	5	10
Ohio	49	0	0	49	100	40	82	16	33
Oklahoma	63	0	0	7	11	7	11	0	0
Oregon	27	0	0	4	15	7	26	0	0
Pennsylvania	34	0	0	15	44	9	27	2	6
Rhode Island	1	0	0	0	0	1	100	1	100
South Carolina	30	0	0	2	7	30	100	0	0
South Dakota	63	0	0	0	0	63	100	0	0
Tennessee	69	0	0	69	100	32	46	3	4
Texas	196	0	0	18	9	60	31	18	9
Utah	25	6	240	0	0	25	100	25	100
Vermont	11	0	0	0	0	0	0	8	73
Virginia	59	0	0	7	12	17	29	0	0
Washington	27	0	0	27	100	18	67	4	15
West Virginia	43	0	0	0	0	5	12	6	14
Wisconsin	51	1	2	35	69	33	65	23	45
Wyoming	21	0	0	0	0	2	10	0	0
Total	2,258	22	1	447	20	1,179	52	302	13

[1]Rural counties are defined as nonmetropolitan counties under the 1990 "Urbanicity Code".

Table 2
Counties in Service Areas of HMOs,
by Model Types

Urbanicity Code	N	Served by Staff Model	Served by Group/Network	Served by IPA	Served by Mixed Model
0 = Large Metropolitan	302	65 (22%)	222 (74%)	284 (94%)	180 (60%)
1 = Small Metropolitan	511	13 (3%)	214 (42%)	416 (81%)	183 (36%)
2 = Non-Metro, adjacent to large metropolitan	184	14 (8%)	59 (32%)	137 (75%)	59 (32%)
3 = Non-Metro, adjacent to small metropolitan	803	4 (.5%)	243 (30%)	515 (64%)	148 (18%)
4 = Non-Metro, non-adjacent, city>10,000	224	3 (1%)	34 (15%)	98 (44%)	32 (14%)
5 = Non-Metro, non-adjacent, no city	1,047	1 (.1%)	111 (11%)	429 (41%)	63 (6%)

Table 3
Counties in Service Areas of HMOs Which Offer
Coverage to Medicare and Medicaid Enrollees

Urbanicity Code	N	Any HMO service area	HMO covers Medicare	HMO covers Medicaid	HMO covers Both
0 = Large Metropolitan	302	294 (97%)	268 (89%)	210 (70%)	196 (65%)
1 = Small Metropolitan	511	446 (87%)	307 (60%)	207 (41%)	187 (37%)
2 = Non-Metro, adjacent to large metropolitan	184	155 (84%)	107 (58%)	69 (38%)	63 (34%)
3 = Non-Metro, adjacent to small metropolitan	803	591 (74%)	305 (38%)	205 (26%)	160 (20%)
4 = Non-Metro, non-adjacent, city>10,000	224	122 (55%)	55 (25%)	40 (18%)	33 (15%)
5 = Non-Metro, non-adjacent, no city	1,047	520 (50%)	154 (15%)	89 (9%)	66 (6%)

Table 4
County Level Predictors of Inclusion in an HMO Service Area

Variable	Included in any HMO service area		Included in non-IPA HMO service area	
	Odds Ratio	(CI)	Odds Ratio	(CI)
Small Metro	**0.31	(0.14,0.65)	**0.48	(0.33,0.72)
Adjacent to Large Metro	0.45	(0.19,1.05)	*0.58	(0.35,0.97)
Adjacent to Small Metro	**0.23	(0.11,0.50)	*0.59	(0.39,0.91)
Non-adjacent, with city>10,000	**0.11	(0.05,0.25)	**0.35	(0.20,0.61)
Non-adjacent, no city	**0.14	(0.06,0.32)	**0.32	(0.19,0.53)
State had HMOs prior to 1980	**0.50	(0.41,0.61)	**1.74	(1.42,2.12)
Chronic HPSA, part county	**1.50	(1.14,1.98)	1.03	(0.78,1.34)
Chronic HPSA, whole county	**1.69	(1.22,2.34)	*1.61	(1.12,2.31)
HPSA sometime between 1978-1990	*1.26	(1.01,1.59)	1.17	(0.92,1.49)
Medically underserved area, 1990	**1.02	(1.01,1.03)	**1.04	(1.03,1.05)
Log, population 1990	0.94	(0.78,1.13)	0.96	(0.79,1.16)
Log, population density 1990	**1.42	(1.23,1.61)	**1.40	(1.21,1.62)
Log, mean per capita income	1.34	(0.75,2.40)	1.65	(0.84,3.24)
Log, percent unemployed	0.92	(0.73,1.15)	**1.63	(1.24,2.16)
Log, percent non-white	**0.88	(0.82,0.93)	**0.79	(0.74,0.85)
Log, population in largest adjacent county, 1990	**1.38	(1.23,1.55)	**1.59	(1.42,1.79)
Percent Correctly Classified	73		78	

* Significance level <.05
** Significance level <.01(%)