



**Assessment of Physician Growth in Counties Targeted
in the Robert Wood Johnson Foundation's Southern Rural Access Program:
December 2001 through October 2005**

Donald E. Pathman, MD MPH
Jennifer S. Groves, MBA
Thomas C. Ricketts, III, PhD, MPH

Programs on Health Professions and Primary Care, and Rural Health
Cecil G. Sheps Center for Health Services Research
University of North Carolina at Chapel Hill

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Background

The Southern Rural Access Program and Initial Evaluation Grant

In 1997 the Robert Wood Johnson Foundation solicited proposals from health care leaders of eight southeastern states for a new initiative, the Southern Rural Access Program (SRAP). The Foundation subsequently awarded grants through this program to leadership consortia in the eight states—Alabama, Arkansas, Georgia, Louisiana, Mississippi, South Carolina, Texas and West Virginia—to support rural programs to “increase the supply of primary care providers in underserved areas” and strengthen the rural health care infrastructure of states and communities and their capacity to address their health needs. Through initial funding and subsequent renewal grants, the program has provided over \$30 million for four types of initiatives intended to (1) recruit and retain primary health care practitioners, (2) develop health professions students committed to careers as leaders in primary care in rural underserved areas (“pipeline” initiatives), (3) develop collaborative networks of rural health providers to foster joint planning and programs, and (4) create revolving loan programs to give rural providers access to affordable capital needed to expand facilities and services.¹ The Rural Health Policy Center at Penn State University served as the SRAP’s National Program Office providing coordination, oversight and technical assistance to the program’s grantees (<http://www.srap.org/>).² Foundation funding for SRAP grantees officially ended in March 2006, though many program initiatives are continuing with other sources of support.

In early 1999 rural health researchers at the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill were awarded a one-year planning grant, subsequently followed by an initial four-year implementation grant to evaluate the SRAP (#036829; May 2000 to October 2004). One of the central tasks of the evaluation was to assess whether SRAP initiatives were making demonstrable improvements in the availability of primary health care professionals in the program’s targeted counties and parishes. In March 2005 the evaluation produced a report entitled “*Growth in Physicians and Advanced-Practice Nurses in Counties Targeted by the Robert Wood Johnson Foundation’s Southern Rural Access Program: 2002 and 2003*,”³ the core of which was analysis of data from the American Medical Association (AMA) on the location of physicians in the rural counties of the SRAP’s eight states. Analysis demonstrated that in 2002 and 2003, the early years of the SRAP, primary care physician to population ratios grew more in the 150 rural counties targeted by the SRAP than in the 457 other rural counties of the same states. Specialist (non-primary care) physicians and nurse practitioners in SRAP-targeted counties did not show stronger relative growth. It was concluded that the

¹ Beachler M, Holloman C, Herman J. Southern Rural Access Program: An Overview. *The Journal of Rural Health*. 2003;19:301-307.

² Hughes RG. National Programs: Understanding the Robert Wood Johnson Foundation Approach to Grantmaking. In: *To Improve Health and Health Care, Volume VIII*. Stephen L. Isaacs and Knickman JR, eds. San Francisco: Jossey-Bass, 2005; pp-177-197.

³ Pathman DE, Groves J, Konrad TR, Ricketts TC, Thaker S. *Growth in Physicians and Advanced-Practice Nurses in Counties Targeted by the Robert Wood Johnson Foundation’s Southern Rural Access Program: 2002 and 2003*. Unpublished report dated March 31, 2005.

SRAP's initiatives had indeed bolstered the presence of primary care physicians—the SRAP's programmatic focus—in targeted counties during the program's early years, but had not increased the availability of specialist physicians or nurse practitioners.

The Extension of the Evaluation Grant

The UNC evaluation team was subsequently awarded a follow-up evaluation grant (#044706) to continue assessing the SRAP from November 2004 through July 2006. One of the follow-up grant's principal activities was to extend for another two years the assessment of the program's impact on physician numbers in SRAP-targeted counties. This report presents this assessment and its findings.

It was anticipated from the outset of the evaluation that the effects of the SRAP's initiatives on health care practitioner availability would unfold progressively over time and might be difficult to document in the four-year span of the initially funded evaluation. While immediate growth in practitioner numbers might be expected from some types of initiatives, such as those expanding regional practitioner recruitment staff, the effects of other initiatives, like those encouraging rural youth to pursue medical careers, would not be seen for seven to ten years or more. Evaluating the SRAP's impact on physician availability over the additional two year period of the evaluation's follow-up grant will likely provide a more accurate assessment of the program's long-term effects than those estimated in the initial four-year evaluation grant, but even an additional two-year evaluation window may still not fully reflect the program's ultimate impact on rural practitioner availability in targeted counties.

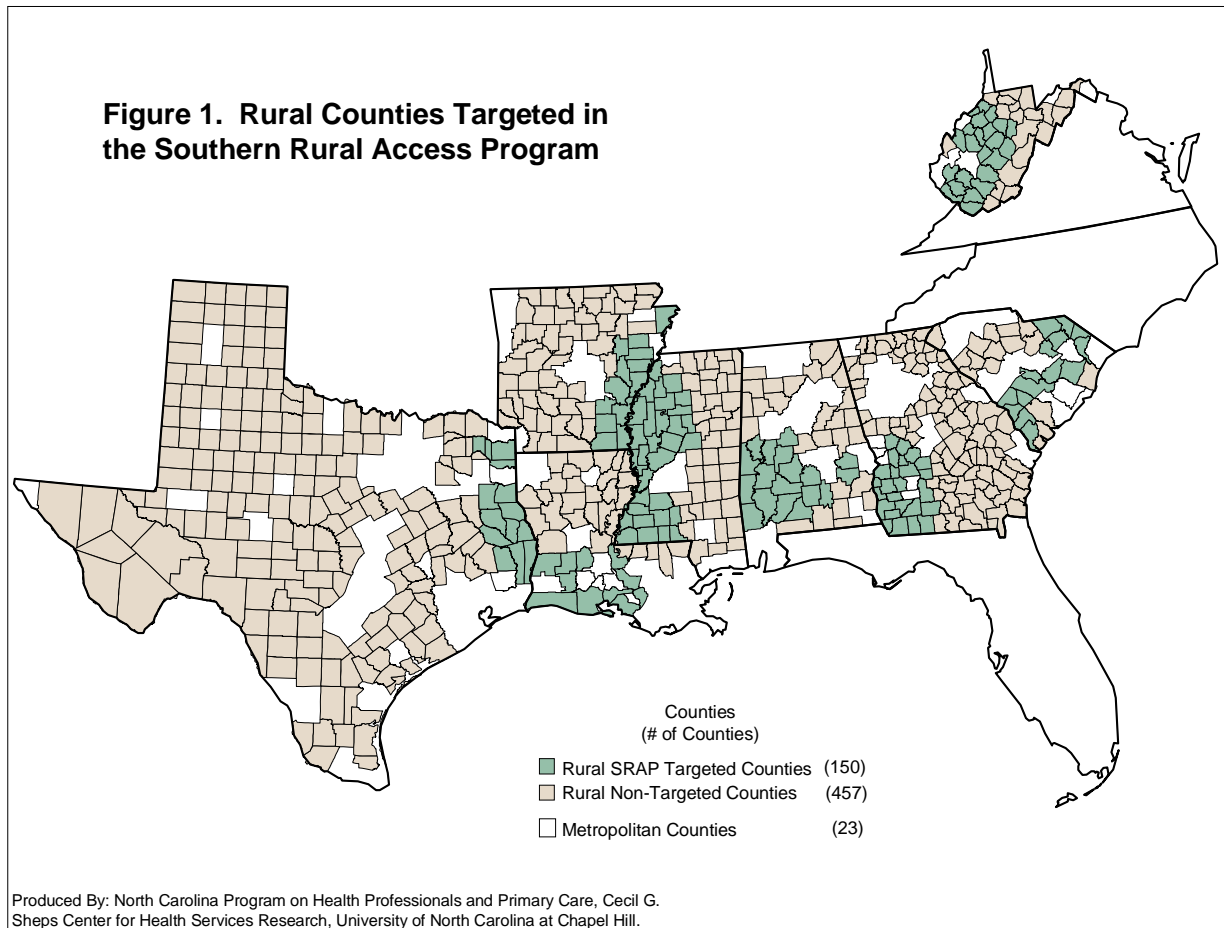
Overview of the Analyses

We principally used an “untreated control group design with pretest and posttest”⁴ to assess physician growth in SRAP counties. Grantees focused their SRAP initiatives on specific clusters of rural counties (“parishes” in Louisiana) starting in March 2002. In this report we assessed growth in physician numbers from December 31, 2001 through October 31, 2005, essentially the first four years of the program's geographically focused interventions. We assessed changes over time in numbers of actively practicing physicians in the SRAP's rural targeted counties and compared this to physician growth over the same period in participating states' other (non-targeted) rural counties (**Figure 1**). Analyses focused on growth in numbers of primary care physicians, rather than physicians of all specialties, since they were the intended health workforce focus in the Foundation's original design of the SRAP and grantees' initiatives strongly emphasized primary care development. However, we also include analyses of changes in specialist physician numbers both to see if numbers of these other physicians were also affected by SRAP initiatives, as well as to provide a different type of control group against which to compare changes seen among primary care physician numbers.

Grantees selected counties for their SRAP activities based largely upon the perceived needs of their populations. In a previous evaluation report we found that SRAP-targeted counties in seven of the eight states had higher poverty rates, higher unemployment rates, and greater racial-ethnic

⁴ Cook TD, Campbell DT. *Quasi-Experimentation*. Boston: Houghton Mifflin, 1979.

minority proportions than other rural counties not targeted for SRAP interventions.⁵ Using all non-targeted rural counties as the comparison group for this report, therefore, potentially masks the SRAP's effects behind group differences in socioeconomic factors, which would be expected to blunt the SRAP's measured effects on physician growth in its targeted counties. We consequently selected a second comparison group of counties more closely matching SRAP's targeted counties, specifically counties with more than 18% of their population living below the federal poverty income level. In analyses using only high-poverty counties as the comparison, we also dropped the relatively few SRAP-targeted counties with poverty rates lower than 18%. The comparison of primary care physician growth in high-poverty SRAP-targeted and high-poverty non-targeted counties is stipulated to be the best, least biased and most pertinent assessment of the SRAP's effects on health care practitioner availability.



⁵ SRAP Evaluation Team. *Characteristics of Counties Selected for SRAP Phase II Initiatives*. Report dated April 25, 2002.

Initial plans were to report physician changes through December 31, 2005; however, in September of 2005 hurricanes Katrina and Rita caused wholesale disruption to the general as well as the physician populations along the Gulf coast counties of several SRAP states. Therefore, we acquired data on physician locations from the AMA as of October 31, 2005, and verified that the disruption of physicians in gulf-coast counties that autumn were not yet showing up in the AMA's data. The analyses presented here thus reflect physician availability up to the time of the hurricanes and are not affected by them.

In our earlier March 2005 evaluation report, we included assessments of changes in nurse practitioner numbers in SRAP and non-SRAP rural counties through December 2003. Those assessments were problematic, however, because there are no reliable national data on nurse practitioner numbers and locations, and state nurse licensing offices of only four of the eight states could provide us with data. Further, we found state data had important limitations, in particular in not identifying individuals who were not actively practicing. Given these data challenges, we were unable to come to any firm conclusions in the earlier report about the SRAP's effects on nurse practitioner availability. For these reasons, we do not include analyses of states' nurse practitioner workforce changes in the present follow-up evaluation report.

For the previous and current reports we used physician data from the American Medical Association's (AMA) Physician Masterfile, acquired through its vendor, Medical Marketing Service, Inc. of Chicago (<http://www.mmslists.com/main.asp>). The Masterfile contains location data on all U.S. allopathic physicians (including both members and non-members of the AMA) and the vast majority of osteopathic physicians, including virtually all younger osteopathic physicians. We explored the use of data from state physician licensing bodies but the AMA data proved preferable for our analyses because (1) their content and quality were uniform across states and (2) we had comparable AMA data on hand for 1996 which allowed our earlier report to assess the pre-intervention growth rate of physicians in both intervention and control group counties (an "untreated control group design with pretest measures at more than one time interval").

The AMA's data contain more than one address for many physicians. Typically physicians' designated "preferred mailing address" is used in analyses of physician locations, even though this address is often a physicians' residence and may be in a different county than where they work. Medical Marketing Services has developed an algorithm for combining information from several fields on the AMA files to select among the available file addresses the one most likely to be the office address. This "max office" address algorithm increases from 60% to 76% the proportion of addresses that reflect offices rather than homes, and most importantly to our analyses of the locations of primary care physicians, increases to 86% the proportion of addresses that reflect office locations of "office-based physicians." We applied this max office algorithm to the physician data used in this report. We excluded physicians listed as not in active practice, e.g., those retired, not practicing, or engaged principally in non-clinical work (e.g., administration, research.).

Findings are presented as the specific numbers of physicians identified as working in SRAP counties and non-SRAP counties, and any numerical differences between the two groups are accepted as "real" in the sense that they are the complete, actual group differences and not calculated numbers based on a sample of counties from each group. Consequently, inferential

statistics are not needed to generate “*p*-values” to assess for statistically significant differences. If counts for the two groups differ, then the groups differ, although the size of the difference may or may not be important. We set a difference of two physicians per 100,000 population as the threshold of meaningful difference for two populations and use this threshold throughout this report.

This report presents data on the following: (1) baseline demographic characteristics for the 150 SRAP rural counties and 457 non-SRAP rural counties of the eight states, (2) primary care physician growth from December 2001 through October 2005 in SRAP and non-SRAP rural counties of all eight states collectively and for each state individually, (3) primary care physician growth from 2001 to 2005 in the poorest (over 18% poverty rate) of SRAP and non-SRAP counties in all eight states combined and in each state individually, (4) breakdown of in-migration and out-migration/retirement rates of primary care physicians from high poverty SRAP and non-SRAP rural counties from 2001 to 2005 in all eight states combined and in each state individually, and (5) specialist physician growth from 2001 to 2005 in SRAP and non-SRAP rural counties in all rural counties of the eight states combined and in their high poverty counties.

Interpreting Program Effects from These Data

In these analyses we looked for patterns of physician-to-population ratio changes that support a positive (or negative) impact of the SRAP’s interventions. The fundamental pattern we stipulated in advance as evidence of a positive program effect was a greater growth in primary care physician to population ratios in SRAP than non-SRAP rural counties during the period from December 2001 through October 2005, the first years that SRAP initiatives were geographically targeted at specific counties. From our earlier March 2005 evaluation report we know that from 1996 to 2001, the years immediately preceding the SRAP, physician growth was greater in the non-SRAP counties than SRAP counties of all eight states, thereby increasing the likelihood that if greater growth is found in SRAP-targeted counties than non-targeted counties after 2001 that it is a consequence of the SRAP’s initiatives.

Growth in the supply of primary care physicians was the focus of the SRAP’s initiatives and the principal outcome assessed in this report. A secondary program outcome assessed is changes in the number of specialist physicians in SRAP-targeted and non-targeted counties from 2001 through 2005, since some of the SRAP’s initiatives may have benefited these practitioners well. On the other hand, if primary care physician numbers are found to have grown more in SRAP-targeted counties than in non-targeted counties but not so the numbers of specialist physicians, this would further strengthen claims that the increase in primary care physicians in SRAP counties was indeed due to the SRAP which targeted primary care workforce growth.

Evaluation Limitations

The limitations of this type of evaluation are many. Its greatest limitation is that this analysis occurs only six years into states' SRAP initiatives and just four years after states focused their initiatives on specific rural counties. This analysis likely comes too early to observe the SRAP's full effects on physician numbers.

Data limitations are also a concern. The AMA's physician data are not perfect. We used Medical Marketing Services' "max office" address algorithm which more reliably identifies office addresses than is typically available from the AMA data, but we will have still misallocated some physicians to their home rather than work counties, or to outdated addresses. We expect file inaccuracies will affect practitioner counts in both SRAP and non-SRAP counties and in both the baseline (2001) and post-intervention (2005) periods and therefore should not create systematic biases (distortions) in the analyses. The non-systematic (random) inaccuracies, however, will add background "noise" to the findings that may obscure program effects.

Additionally, the patterns of change in primary care physician supply that we accept as evidence for the impact of the SRAP's interventions may be due in part or entirely to other programs, forces and trends in the study and/or comparison counties. During the early study years, for example, rising malpractice insurance costs created financial disincentives for physicians to practice in some states. Conversely, since 2001 the federal Delta States Rural Development Network Initiative (<http://ruralhealth.hrsa.gov/funding/Delta.htm>) has worked to build the community health resources of some of the SRAP and non-SRAP counties, and may have drawn physicians into these areas. **Consequently, the findings of this evaluation can only provide *evidence for or against* the SRAP's initiatives having an effect on physician availability in SRAP counties, but do not prove that any observed changes are due to the SRAP's efforts.**

Summary of Findings

A. County Group Demographics

1. As a whole, the SRAP's 150 targeted rural counties were substantially more socio-economically stressed than the other 457 rural counties of the eight participating states, and they saw less population growth over the study period.

B. Primary Care Physicians

B.1. Primary Care Physicians in All 150 SRAP and 457 Comparison Counties

2. At the 2001 baseline, primary care physician-to-population ratios were slightly lower, on average, in the 150 SRAP counties than in the 457 non-SRAP counties (58.5 vs. 61.7 physicians per 100,000 population). During the years of SRAP support from December 2001 through October 2005, primary care physician numbers grew more slowly in SRAP counties than non-SRAP counties (4.5% vs. 8.4%). When adjusting for greater population growth in non-SRAP counties, growth in primary care physicians per 100,000 population grew at comparable rates in the two groups of counties (3.08 vs. 3.57 physicians per 100,000 population) over the four years. Thus, data from all intervention and non-intervention counties in all eight states examined as a group suggest that the SRAP did not effect primary care physician availability in its targeted counties over the four-year study period.
3. Examining state by state, patterns of physician supply changes suggests that SRAP initiatives *positively* affected primary care physician-to-population growth rates in SRAP-targeted counties and parishes in two states (Alabama and Louisiana) and *negatively* affected the growth rate in one state (Georgia). In the remaining five states no significant differences were seen in the primary care physician-to-population growth rate in SRAP and non-SRAP counties, suggesting no program effects.

B.2. Primary Care Physicians in High Poverty Counties

4. At baseline, there were 124 SRAP and 202 non-SRAP counties with poverty rates of 18% or greater. At baseline, the number of primary care physicians per 100,000 population was slightly higher in high poverty SRAP counties than high poverty non-SRAP counties (57.1 vs. 54.9). During the four years of SRAP support, primary care physician numbers grew at faster rates in high poverty SRAP counties (4.4%) than high poverty non-SRAP counties (1.7%). Ratios of primary care physicians per 100,000 population similarly grew faster in high poverty SRAP counties than in high poverty non-SRAP counties (by 3.21 vs. 0.50 physicians/100,000). If ratios of primary care physicians per 100,000 population grew proportionately the same amount over the four years within SRAP high poverty counties as they did within non-SRAP high poverty counties (i.e., at 0.9% rather than 5.6%) then there would have been 73 fewer primary care physicians working in high poverty SRAP counties in 2005 than were found.

5. Growth patterns suggest that the effects of SRAP interventions within high poverty counties and parishes were positive in four states (Alabama, Louisiana, Texas and West Virginia) and negative in two states (Georgia and Mississippi). There were no significant differences in primary care physician to population growth rates between the high poverty SRAP and non-SRAP counties of Georgia and Mississippi and too few high poverty non-SRAP counties in South Carolina to permit meaningful comparisons.
6. The greater primary care physician growth in high poverty SRAP than non-SRAP counties of the eight states combined resulted principally from lower out-migration rates from the SRAP than non-SRAP counties (28.9% vs. 32.1%); the in-migration rates of the two county groups were virtually identical (33.4% vs. 33.8%). Within the four states where physician growth was greater in high poverty SRAP than non-SRAP counties, greater growth in SRAP counties was variably due to higher in-migration rates, lower out-migration rates, and a combination of the two.

C. Specialist Physicians

C.1. Specialist Physicians in All 150 SRAP and 457 Comparison Counties

7. At the 2001 baseline the number of specialist physicians per 100,000 population was lower in SRAP counties than in non-SRAP counties (41.5 vs. 52.0). From 2001 through 2005 during the years of SRAP support, specialist growth was slower in the SRAP than non-SRAP county groups.

C.2. Specialist Physicians in High Poverty Counties

8. At baseline the numbers of specialist physicians per 100,000 population were comparable in the 124 high poverty SRAP counties and 202 high poverty non-SRAP counties (35.7 vs. 34.0). During the four years of SRAP support, specialist physicians per 100,000 population ratios grew less in high poverty SRAP counties than high poverty non-SRAP counties (5.1% vs. 8.9%). The SRAP's initiatives, therefore, do not appear to have bolstered the growth of specialist physician numbers in SRAP counties.

Conclusions

At this point in the Southern Rural Access Program's history, analyses of physician data in high-poverty SRAP-targeted and comparison rural counties and parishes suggest that from late 2001 to late 2005 the SRAP promoted the growth of primary care physicians in its targeted counties. No similar favorable growth was observed in primary care physician numbers in targeted counties prior to 1991 (based on earlier analyses presented in a March 2005 report) or in specialist physician numbers in targeted counties (high poverty or otherwise) from 2001 to 2005. Positive growth among only primary care physicians and only during the intervention period makes it likely that this growth was indeed due to the initiatives of the SRAP. SRAP grantees generally targeted the poorest rural counties in their states; only when poverty rate differences between targeted and comparison counties were controlled for with subgroup analysis was the stronger primary care physician growth within targeted counties uncovered.

We estimate that as of October 31, 2005 the SRAP was responsible for recruiting and/or retaining 73 of the primary care physicians who were then practicing in the SRAP's 124 high poverty counties. It is reasonable to assume that the SRAP helped recruit and/or retain additional primary care physicians in the SRAP's other 26 rural and 15 urban counties not included in the analyses of physician changes within high poverty rural counties.

Detailed Findings

Part A. County Group Demographics

Overview of Findings:

As a whole, the SRAP's 150 targeted rural counties were substantially more socio-economically stressed than the other 457 rural counties of the eight participating states, and they saw less population growth over the study period.

- The 150 rural counties targeted in the SRAP had a combined population of over 3.4 million in the 2001 baseline year. In the same year the 457 non-targeted rural counties of these eight states, which serve as the comparison counties and populations for this report, had a combined population of 10.1 million.
- From 1996 to 2001 prior to the SRAP's targeted interventions, non-SRAP rural counties as a group experienced greater population growth than SRAP rural counties. During the 2001 to 2005 intervention period, population growth slowed from the pre-2001 rate in non-SRAP counties as a group and the combined population of SRAP counties actually shrank in size.
- Population characteristics of SRAP rural counties differed substantially from non-SRAP rural counties. On average SRAP counties had larger populations but had higher proportions in poverty, higher unemployment rates, greater racial-ethnic minority compositions, and higher infant mortality rates (**Table 1**). These differences between SRAP and non-SRAP counties held in all states, with a few exceptions: (1) Louisiana's SRAP parishes demonstrated less socio-economic need on all four measures than its other rural parishes, (2) West Virginia had few racial-ethnic minorities in both its SRAP and non-SRAP rural counties (about 3%) and, (3) poverty rates were slightly higher in Texas' and West Virginia's non-SRAP than SRAP counties, but their SRAP counties had greater socioeconomic need by the other three measures.

Table 1. Demographic characteristics of SRAP and non-SRAP counties of the eight states

| | SRAP Counties (n=150) | Non-SRAP Counties (n=457) |
|--|----------------------------------|--------------------------------------|
| Total population | | |
| 1996 | 3,387,021 | 9,562,973 |
| 2001 | 3,438,904 | 10,146,434 |
| Average annual % change from 1996 to 2001 | 0.30% | 1.15% |
| 2005 | 3,413,133 | 10,398,079 |
| Average annual % change from 2001 to 2005 | -0.19% | 0.62% |
| Median county population (2001) | 20,339 | 16,714 |
| Mean county percent individuals below poverty (1999) | 21.8% | 17.9% |
| Mean county percent unemployed (2001) | 8.2% | 5.7% |
| Mean percent county racial/ethnic minority population (2000) | 40.5% | 22.6% |
| Mean county infant mortality per 1000 live births (1996-2000) | 10.3% | 8.2% |

Part B. Primary Care Physicians

B.1. Primary Care Physicians in All 150 SRAP and 457 Comparison Counties

Overview of Findings:

At the 2001 baseline, primary care physician-to-population ratios were slightly lower, on average, in the 150 SRAP counties than in the 457 non-SRAP counties (58.5 vs. 61.7 physicians per 100,000 population). During the years of SRAP support from December 2001 through October 2005, primary care physician numbers grew more slowly in SRAP counties than non-SRAP counties (4.5% vs. 8.4%). When adjusting for greater population growth in non-SRAP counties, growth in primary care physicians per 100,000 population grew at comparable rates in the two groups of counties (3.08 vs. 3.57 physicians per 100,000 population) over the four years. Thus, data from all intervention and non-intervention counties in all eight states examined as a group suggest that the SRAP did not effect primary care physician availability in its targeted counties over the four-year study period.

Examining state by state patterns of physician supply changes suggests that SRAP initiatives *positively* affected primary care physician-to-population growth rates in SRAP-targeted counties and parishes in two states (Alabama and Louisiana) and *negatively* affected the growth rate in one state (Georgia). In the remaining five states no significant differences were seen in the primary care physician-to-population growth rate in SRAP and non-SRAP counties, suggesting no program effects.

Primary care physicians—family physicians, general internists, general pediatricians and obstetrician/gynecologists—are the specialties principally targeted in states’ SRAP initiatives. We posited that the changes in primary care physician-to-population ratios in SRAP counties, relative to changes in non-SRAP counties, was a good indicator of the overall effect of states’ physician recruitment and retention efforts. With the data of **Table 2**, we find the following.

- At the 2001 baseline point, there were many fewer primary care physicians in SRAP than non-SRAP counties, but the total population was also smaller in SRAP counties. Primary care physician-to-population ratios were just slightly lower in SRAP than non-SRAP counties at baseline (58.5 vs. 61.7 primary care physicians per 100,000 population, respectively).
- During the period of SRAP support from December 2001 through October 2005, primary care physician numbers grew more slowly in the 150 SRAP counties than in the 457 non-SRAP counties in terms of physician counts (90 vs. 526 physicians) and percentage change (4.5% vs. 8.4%).
- Growth in primary care physician-to-population ratios from 2001 through 2005 was comparable in SRAP and non-SRAP counties (3.08 vs. 3.57 physicians per 100,000 population, respectively).

- From 2001 through 2005 primary care physicians *increased* in comparable proportions of SRAP and non-SRAP counties (45.3% in both groups) and *decreased* in comparable proportions of the county groups (35.3% vs. 31.3%).

The SRAP's effects on primary care physician-to-population ratios may have differed across the eight states. We examined, therefore, how primary care physician-to-population ratios changed in the SRAP versus non-SRAP rural counties and parishes of each of the eight states individually. We accepted a growth difference of 2 or more physicians per 100,000 population as significant. With data of **Table 3** we conclude the following:

- Baseline (2001) primary care physician per 100,000 population ratios varied significantly across states' SRAP county groups from 52.8 to 66.3; baseline ratios varied even more across states' non-SRAP counties, ranging from 50.8 to 115.4.
- From 2001 to 2005 primary care physician per 100,000 population ratios increased in the SRAP counties of three states, decreased in one state, and did not change significantly (i.e., by more than 2 physicians per 100,000 population) in four states. Ratios in non-SRAP counties increased in six states and did not change significantly in two states.
- Ratio changes suggesting *positive* effects of SRAP initiatives on primary care physician growth were seen in two states. From 2001 through 2005, substantially greater growth (by 2 or more physicians per 100,000 population) occurred in the SRAP than non-SRAP counties of Alabama (6.54 vs. 0.66, respectively) and in Louisiana (8.99 vs. -1.08).
- Data from five states were consistent with a *negative* effect of SRAP-initiatives on primary care physician growth. From 2001 to 2005 primary care physician-to-population ratios grew significantly more in non-SRAP counties than SRAP counties in Arkansas, Georgia, Mississippi, South Carolina and West Virginia.
- In Texas primary care physician-to-population growth did not significantly differ between SRAP and non-SRAP counties, suggesting no program effect.

Table 2. Primary care physicians (PCP) in SRAP and non-SRAP counties, 2001 and 2005

| | SRAP Counties (n=150) | | Non-SRAP Counties (n=457) | |
|---------------------------------------|--------------------------|----------------|------------------------------|----------------|
| | 2001 | 2005 | 2001 | 2005 |
| Total number of PCPs | 2,013 | 2,103 | 6,257 | 6,783 |
| Change in PCPs from 2001 to 2005 | --- | 90 (4.5%) | --- | 526 (8.4%) |
| Number (%) of counties with: | | | | |
| <i>increase</i> in PCPs | --- | 68 (45.3%) | --- | 207 (45.3%) |
| <i>decrease</i> in PCPs | --- | 53 (35.3%) | --- | 143 (31.3%) |
| <i>no change</i> in PCPs | --- | 29 (19.3%) | --- | 107 (23.4%) |
| PCPs per 100,000 population | 58.5 | 61.6 | 61.7 | 65.2 |
| Change in PCPs per 100,000 population | --- | 3.08 (5.3%) | --- | 3.57 (5.8%) |

Data: AMA Masterfile “Max Office” addresses

Table 3. Primary care physicians in SRAP and non-SRAP counties, 2001 to 2005, by state

| | SRAP Counties | | | | | | Non-SRAP Counties | | | | | |
|------------------------|---------------|----------------------------|-------------|----------------------------|--------------------------|-----------------------------------|-------------------|----------------------------|-------------|----------------------------|--------------------------|-----------------------------------|
| | 2001 | | 2005 | | Change | | 2001 | | 2005 | | Change | |
| | PCPs (n) | PCPs per 100K pop | PCPs (n) | PCPs per 100K pop | Change in PCPs (n) | Change in PCPs per 100K pop | PCPs (n) | PCPs per 100K pop | PCPs (n) | PCPs per 100K pop | Change in PCPs (n) | Change in PCPs per 100K pop |
| ALL SRAP STATES | 2013 | 58.5 | 2103 | 61.6 | 90 | 3.08 | 6257 | 66.7 | 6783 | 65.2 | 526 | 3.57 |
| Alabama | 179 | 52.8 | 197 | 59.3 | 18 | 6.54 | 554 | 55.6 | 564 | 56.3 | 10 | 0.66 |
| Arkansas | 141 | 53.6 | 125 | 49.7 | (16) | (3.92) | 691 | 63.5 | 727 | 65.8 | 36 | 2.33 |
| Georgia | 229 | 63.4 | 235 | 64.7 | 6 | 1.31 | 1420 | 64.8 | 1658 | 71.9 | 238 | 7.13 |
| Louisiana | 220 | 55.8 | 256 | 64.8 | 36 | 8.99 | 356 | 50.8 | 347 | 49.7 | (9) | (1.08) |
| Mississippi | 412 | 60.0 | 401 | 59.3 | (11) | (0.70) | 659 | 58.2 | 698 | 60.9 | 39 | 2.69 |
| South Carolina | 270 | 54.5 | 285 | 57.7 | 15 | 3.14 | 534 | 74.2 | 591 | 79.4 | 57 | 5.19 |
| Texas | 237 | 58.0 | 246 | 59.6 | 9 | 1.60 | 1411 | 50.9 | 1510 | 53.1 | 99 | 2.15 |
| West Virginia | 325 | 66.3 | 358 | 73.4 | 33 | 1.16 | 632 | 115.4 | 688 | 124.3 | 56 | 8.94 |

Data: AMA Masterfile Max Office addresses

Figures in parentheses represent physician losses (decreases)

B.2. Primary Care Physicians in High Poverty Counties

Overview of Findings:

At baseline, there were 124 SRAP and 202 non-SRAP counties with poverty rates of 18% or greater. At baseline, the number of primary care physicians per 100,000 population was slightly higher in high poverty SRAP counties than high poverty non-SRAP counties (57.1 vs. 54.9). During the four years of SRAP support, primary care physician numbers grew at faster rates in high poverty SRAP counties (4.4%) than high poverty non-SRAP counties (1.7%). Ratios of primary care physicians per 100,000 population similarly grew faster in high poverty SRAP counties than in high poverty non-SRAP counties (by 3.21 vs. 0.50 physicians/100,000). If ratios of primary care physicians per 100,000 population grew proportionately the same amount over the four years within SRAP high poverty counties as they did within non-SRAP high poverty counties (i.e., at 0.9% rather than 5.6%) then there would have been 73 fewer primary care physicians working in high poverty SRAP counties in 2005 than were found.

Growth patterns suggest that the effects of SRAP interventions within high poverty counties and parishes were positive in four states (Alabama, Louisiana, Texas and West Virginia) and negative in two states (Georgia and Mississippi). There were no significant differences in primary care physician to population growth rates between the high poverty SRAP and non-SRAP counties of Georgia and Mississippi and too few high poverty non-SRAP counties in South Carolina to permit meaningful comparisons.

The greater primary care physician growth in high poverty SRAP than non-SRAP counties of the eight states combined resulted principally from lower out-migration rates from the SRAP than non-SRAP counties (28.9% vs. 32.1%); the in-migration rates of the two county groups were virtually identical (33.4% vs. 33.8%). Within the four states where physician growth was greater in high poverty SRAP than non-SRAP counties, greater growth in SRAP counties was variably due to higher in-migration rates, lower out-migration rates, and a combination of the two.

Poverty rates were higher in SRAP than non-SRAP counties, as a whole, and these differences may have masked the effects of the SRAP on the growth of primary care physicians. We consequently repeated the prior comparisons of primary care physician growth rates for the subgroup of counties with poverty rates of 18% or greater, which is the average poverty rate among the non-SRAP counties. We find the following based on the data of **Table 4**.

- 124 of the 150 rural SRAP counties (82.7%) had more than 18.0% of individuals in poverty in 1999; among non-SRAP counties a lower proportion—202 of the 457 (44.2%)—had poverty rates above 18.0%.
- Baseline (2001) primary care physician per 100,000 population ratios were only slightly lower in the subgroup of 124 high poverty SRAP counties than in the 150 SRAP counties as a whole (57.1 versus 58.5) (comparing data in **Table 2** and **Table 4**). Baseline

primary care physician-to-population ratios differed more between the subgroup of 202 high poverty non-SRAP counties and all 457 non-SRAP counties (54.9 versus 61.7).

- At baseline the number of primary care physicians per 100,000 population was slightly greater in the high poverty SRAP counties than high poverty non-SRAP counties (57.1 vs. 54.9).
- During the period of SRAP support from December 2001 through October 2005, primary care physician numbers grew more in high poverty SRAP counties than high poverty non-SRAP counties in terms of physician counts (69 vs. 33 physicians) and percent change (4.4% vs. 1.7%).
- Growth in the number of primary care physicians per 100,000 population from 2001 through 2005 was also greater in high poverty SRAP counties than high poverty non-SRAP counties (3.21 vs. 0.50 physicians per 100,000, respectively). These comparative growth rates suggest that the SRAP had a positive effect on primary care physician growth in high poverty counties.
- If ratios of primary care physicians per 100,000 population grew proportionately the same amount over the four years within SRAP high poverty counties as they did within non-SRAP high poverty counties (i.e., at 0.9% rather than 5.6%) then there would have been 73 fewer primary care physicians working in high poverty SRAP counties in 2005 than were found.

The SRAP's effects on primary care physician to population ratios in high poverty counties may have differed across the eight states. We examined, therefore, how ratios changed in high poverty SRAP versus non-SRAP rural counties and parishes of each of the eight states. We accepted a growth difference of 2 or more physicians per 100,000 population over the four years as significant. From the data of **Table 5** we conclude the following:

- The data suggest that the SRAP had a *positive* effect on primary care physician growth in the high poverty counties of our states. From 2001 through 2005, substantially greater growth in number of primary care physicians per 100,000 population occurred in high poverty SRAP than high poverty non-SRAP counties in Alabama (6.74 vs. -1.90, respectively), Louisiana (9.45 vs. -3.16), Texas (5.52 vs. 0.92) and West Virginia (3.32 vs. -2.33).
- Primary care physician data from high poverty counties were consistent with a *negative* effect of SRAP initiatives in one state. From 2001 to 2005 primary care physician to population ratios decreased in Arkansas' high poverty SRAP counties whereas they rose modestly in its high poverty non-SRAP counties (-3.62 vs. 0.37).
- In two states, Georgia and Mississippi, the primary care physician to population growth rates did not differ significantly between high poverty SRAP and non-SRAP counties,

suggesting no program effects.

- In South Carolina there was only one non-SRAP county with greater than 18% poverty; consequently, it was not possible to meaningfully compare SRAP vs. non-SRAP primary care physician growth within high poverty counties in this state.

The greater overall growth in primary care physicians in the high poverty counties supported by the SRAP than in the comparison high poverty counties could be due to greater recruitment rates (higher in-migration) or greater retention rates (lower out-migration). We therefore compared SRAP-targeted and non-targeted high poverty counties of each state on the proportion of primary care physicians practicing there in 2005 who were not there in 2001 (in-migration rates) and the proportion of their physicians in 2001 who were no longer practicing in the same county in 2005 (out-migration rate). From the data of **Table 6** we conclude the following:

- From December 2001 to October 2005, 522 primary care physicians moved into and 453 moved out of or retired from the high poverty SRAP counties of the eight states. Given the 1,565 primary care physicians in these counties as of December 2001, this represents a 33.4% in-migration percentage over the nearly four years and 28.9% out-migration/retirement rate, the difference yielding the growth by 69 physicians over this period, or 4.4% overall growth in physician numbers in high poverty counties (**Table 4**).

Over the same period, 645 primary care physicians moved into and 612 moved out of or retired from the high poverty non-SRAP counties of the eight states combined. With 1,908 primary care physicians present in 2001, this represents a 33.8% in-migration rate over the four years and 32.1% out-migration/retirement rate, the difference yielding a net increase of 33 physicians, or a 1.7% overall physician growth (**Table 4**).

- When looking at the eight states combined, the greater primary care physician growth in high poverty SRAP than non-SRAP counties (4.4% vs. 1.7%) resulted from lower out-migration rates from the SRAP than non-SRAP counties (28.9% vs. 32.1%): the in-migration rates of the two county groups were virtually identical (33.4% vs. 33.8%).
- In the four states where the primary care physician growth rate was substantially greater in high poverty SRAP than high poverty non-SRAP counties, the greater growth in SRAP counties was principally due to lower out-migration in two states (Texas and West Virginia), higher in-migration in a third state (Alabama), and a combination of lower out-migration and higher in-migration in the fourth state (Louisiana).

Table 4. Primary care physicians (PCP) in *high poverty* SRAP and non-SRAP counties, 2001 and 2005

| | SRAP High Poverty Counties (n=124) | | Non-SRAP High Poverty Counties (n=202) | |
|---------------------------------------|---|----------------|---|----------------|
| | 2001 | 2005 | 2001 | 2005 |
| Total number of PCPs | 1,565 | 1,634 | 1,908 | 1,941 |
| Change in PCPs | --- | 69 (4.4%) | --- | 33 (1.7%) |
| Number (%) of counties with: | | | | |
| <i>increase</i> in PCPs | --- | 59 (47.6%) | --- | 76 (37.6%) |
| <i>decrease</i> in PCPs | --- | 42 (33.9%) | --- | 71 (35.1%) |
| <i>no change</i> in PCPs | --- | 23 (18.5%) | --- | 55 (27.2%) |
| PCPs per 100,000 population | 57.1 | 60.3 | 54.9 | 55.4 |
| Change in PCPs per 100,000 population | --- | 3.21 (5.6%) | --- | 0.50 (0.9%) |

Data: AMA Masterfile "Max Office" addresses

Table 5. Primary care physicians in SRAP and non-SRAP *high poverty* counties, 2001 to 2005, by state

| | SRAP High Poverty Counties (n=124) | | | | | | Non-SRAP High Poverty Counties (n=202) | | | | | |
|----------------------------|---------------------------------------|----------------------------|-------------|----------------------------|--------------------------|-----------------------------------|---|----------------------------|-------------|----------------------------|--------------------------|-----------------------------------|
| | 2001 | | 2005 | | Change | | 2001 | | 2005 | | Change | |
| | PCPs (n) | PCPs per 100K pop | PCPs (n) | PCPs per 100K pop | Change in PCPs (n) | Change in PCPs per 100K pop | PCPs (n) | PCPs per 100K pop | PCPs (n) | PCPs per 100K pop | Change in PCPs (n) | Change in PCPs per 100K pop |
| ALL SRAP STATES | 1565 | 57.1 | 1634 | 60.3 | 69 | 3.21 | 1908 | 54.9 | 1941 | 55.4 | 33 | 0.50 |
| Alabama | 169 | 53.1 | 186 | 59.9 | 17 | 6.74 | 117 | 65.1 | 113 | 63.1 | (4) | (1.9) |
| Arkansas | 103 | 51.6 | 91 | 48.0 | (12) | (3.62) | 137 | 59.6 | 136 | 59.9 | (1) | 0.37 |
| Georgia | 174 | 59.9 | 181 | 62.3 | 7 | 2.41 | 348 | 63.1 | 382 | 67.5 | 34 | 4.37 |
| Louisiana | 196 | 55.8 | 229 | 65.2 | 33 | 9.45 | 312 | 52.2 | 293 | 49.1 | (19) | (3.16) |
| Mississippi | 370 | 58.0 | 362 | 57.7 | (8) | (0.33) | 321 | 56.2 | 321 | 56.1 | 0 | (0.15) |
| South Carolina | 228 | 58.1 | 239 | 61.1 | 11 | 3.04 | 23 | 59.7 | 30 | 75.7 | 7 | ** |
| Texas | 107 | 57.7 | 118 | 63.1 | 11 | 5.52 | 565 | 46.9 | 583 | 47.9 | 18 | 0.92 |
| West Virginia | 218 | 59.5 | 228 | 62.8 | 10 | 3.32 | 85 | 79.7 | 83 | 77.3 | (2) | (2.33) |

Data: AMA Masterfile Max Office addresses

** With only one non-SRAP county with more than 18% poverty, South Carolina's data on changes in PCPs per 100,000 population would be unstable and potentially non representative, and are therefore not presented

Table 6. Migration of primary care physicians into and out of high poverty SRAP and non-SRAP counties from 2001 to 2005, by state

| State | Total # 2001 | Total # 2005 | % Growth in #'s from 2001 to 2005 | # In-migrants from 2001 to 2005 | # Out-migrants from 2001 to 2005 | Ratio of in-migrants to 2001 total | Ratio of out-migrants to 2001 total |
|-------------------|-----------------|-----------------|---|---------------------------------------|--|--|---|
| ALL STATES | | | | | | | |
| SRAP | 1,565 | 1,634 | 4.4% | 522 | 453 | 0.334 | 0.289 |
| Non-SRAP | 1,908 | 1,941 | 1.7% | 645 | 612 | 0.338 | 0.321 |
| ALABAMA | | | | | | | |
| SRAP | 169 | 186 | 10.1 % | 69 | 52 | 0.408 | 0.308 |
| Non-SRAP | 117 | 113 | -3.4 % | 35 | 39 | 0.299 | 0.333 |
| ARKANSAS | | | | | | | |
| SRAP | 103 | 91 | - 11.7 % | 23 | 35 | 0.223 | 0.340 |
| Non-SRAP | 137 | 136 | - 0.7 % | 44 | 45 | 0.321 | 0.328 |
| GEORGIA | | | | | | | |
| SRAP | 174 | 181 | 4.0 % | 69 | 62 | 0.397 | 0.356 |
| Non-SRAP | 348 | 382 | 9.7 % | 144 | 110 | 0.414 | 0.316 |
| LOUISIANA | | | | | | | |
| SRAP | 196 | 229 | 16.8 % | 77 | 44 | 0.393 | 0.224 |
| Non-SRAP | 312 | 293 | -6.1 % | 80 | 99 | 0.256 | 0.317 |
| MISSISSIPPI | | | | | | | |
| SRAP | 370 | 362 | - 2.2 % | 99 | 107 | 0.268 | 0.289 |
| Non-SRAP | 321 | 321 | -2.8 % | 88 | 88 | 0.274 | 0.274 |
| SOUTH CAROLINA | | | | | | | |
| SRAP | 228 | 239 | 4.8 % | 70 | 59 | 0.307 | 0.259 |
| Non-SRAP | 23 | 30 | -- | -- | -- | -- | -- |
| TEXAS | | | | | | | |
| SRAP | 107 | 118 | 10.3 % | 38 | 27 | 0.355 | 0.252 |
| Non-SRAP | 565 | 583 | 3.2 % | 208 | 190 | 0.368 | 0.336 |
| WEST VIRGINIA | | | | | | | |
| SRAP | 218 | 228 | 4.6 % | 82 | 72 | 0.376 | 0.330 |
| Non-SRAP | 85 | 83 | 0.9 % | 35 | 37 | 0.412 | 0.435 |

Data: AMA Masterfile "Max Office" addresses

Figures for non-SRAP area of South Carolina are from one county and are too small to be stable or useful as a comparison

Part C. Specialist Physicians

C.1. Specialist Physicians in All 150 SRAP and 457 Comparison Counties

Overview of Findings:

At the 2001 baseline the number of specialist physicians per 100,000 population was lower in SRAP counties than in non-SRAP counties (41.5 vs. 52.0). From 2001 through 2005 during the years of SRAP support, specialist growth was slower in the SRAP than non-SRAP county groups.

Specialist physicians, defined as physicians practicing in specialties other than family practice, general internal medicine, general pediatrics and obstetrics/gynecology, were not the focus of the SRAP's initiatives. Although we generally would not expect specialist numbers to be affected by the SRAP initiatives, specialists were eligible for support through some of the SRAP's initiatives, like revolving loan funds and network participation, and their numbers may have grown as a consequence. Based on the data of **Table 7** we conclude the following about specialist physician growth:

- At the 2001 baseline, specialists were less available in SRAP counties than in non-SRAP counties (41.5 vs. 52.0 specialists per 100,000 population, respectively).
- During years of SRAP support from December 2001 through October 2005 there was a 1.0% growth in specialist physicians in SRAP counties and a greater 2.7% growth in non-SRAP counties. Proportionally fewer SRAP than non-SRAP counties saw growth in their specialist physician numbers (38.7% vs. 42.5%) and more saw their specialist numbers decrease (33.3% vs. 27.1%).
- There was less growth in the number of specialist physicians per 100,000 population in SRAP counties than non-SRAP counties (1.51 vs. 6.22). Similarly, the percent change in ratios of specialists per 100,000 population was less in SRAP than non-SRAP counties (3.6% vs. 12.0%).
- These data suggest that the SRAP initiatives did not positively influence the growth of specialist physicians in SRAP counties from 2001 through 2005

Table 7. Specialist physicians in *all* SRAP and non-SRAP counties, 2001 and 2005

| | SRAP Counties (n=150) | | Non-SRAP Counties (n=457) | |
|--|--------------------------|----------------|------------------------------|-----------------|
| | 2001 | 2005 | 2001 | 2005 |
| Total number of specialists | 1,428 | 1,469 | 5,273 | 6,051 |
| Change in specialists | --- | 41 (1.0%) | --- | 142 (2.7%) |
| Number (%) of counties with: | | | | |
| <i>increase</i> in specialists | --- | 58 (38.7%) | --- | 194 (42.5%) |
| <i>decrease</i> in specialists | --- | 50 (33.3%) | --- | 124 (27.1%) |
| <i>no change</i> in specialists | --- | 42 (28.0%) | --- | 139 (30.3%) |
| Specialists per 100,000 pop | 41.5 | 43.0 | 52.0 | 58.2 |
| Change in specialists per 100,000 pop | --- | 1.51 (3.6%) | --- | 6.22 (12.0%) |

Data: AMA Masterfile "Max Office" addresses

C.2. Specialist Physicians in High Poverty Counties

Overview of Findings:

At baseline the numbers of specialist physicians per 100,000 population were comparable in the 124 high poverty SRAP counties and 202 high poverty non-SRAP counties (35.7 vs. 34.0). During the four years of SRAP support, specialist physicians per 100,000 population ratios grew less in high poverty SRAP counties than high poverty non-SRAP counties (5.1% vs. 8.9%). The SRAP's initiatives, therefore, do not appear to have bolstered the growth of specialist physician numbers in SRAP counties.

Prior analyses in this report suggest that the SRAP's effects on primary care physicians are evident only when comparing county groups with high proportions of individuals living in poverty. The SRAP's effects on specialist physicians might also be evident only in comparisons within high poverty counties. Conversely, if specialist physician growth is found not to be greater within high-poverty SRAP targeted than non-targeted counties, it will help confirm that factors extraneous to the SRAP were not affecting rural physicians generally and are not responsible for the greater primary care physician growth found in SRAP counties. We therefore assessed specialist physician growth rates in the subgroup of SRAP and non-SRAP counties with poverty rates of 18% and greater. We find the following based on the data of **Table 8**.

- At baseline the number of specialist physicians per 100,000 population were comparable in high poverty SRAP counties and high poverty non-SRAP counties (35.7 vs. 34.0).
- During the period of SRAP support from December 2001 through October 2005, specialist physician numbers grew less in high poverty SRAP counties than high poverty non-SRAP counties (3.9% vs. 9.8%).
- Growth in specialist physicians per 100,000 population was also less in high poverty SRAP counties than high poverty non-SRAP counties (5.1% vs. 8.9%).
- The lack of greater growth in specialist physicians in high poverty SRAP than non-SRAP counties, coupled with the earlier finding of greater growth in primary care physicians in these same high poverty SRAP counties, suggests that SRAP initiatives were indeed responsible for the greater relative growth in primary care physicians found there.

Table 8. Specialist physicians in *high poverty* SRAP and non-SRAP counties, 2001 and 2005

| | SRAP Counties (n=124) | | Non-SRAP Counties (n=202) | |
|--|--------------------------|----------------|------------------------------|---------------|
| | 2001 | 2005 | 2001 | 2005 |
| Total number of specialists | 978 | 1,016 | 1,181 | 1,297 |
| Change in specialists | --- | 38 (3.9%) | --- | 116 (9.8%) |
| Number (%) of counties with: | | | | |
| <i>increase</i> in specialists | --- | 49 (39.5%) | --- | 73 (36.1%) |
| <i>decrease</i> in specialists | --- | 42 (33.9%) | --- | 54 (26.7%) |
| <i>no change</i> in specialists | --- | 33 (26.6%) | --- | 75 (37.1%) |
| Specialists per 100,000 pop | 35.7 | 37.5 | 34.0 | 37.0 |
| Change in specialists per 100,000 pop | --- | 1.82 (5.1%) | --- | 3.0 (8.9%) |

Data: AMA Masterfile "Max Office" addresses

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