
Children's Use of Primary and Preventive Care Under Medicaid Managed Care

Norma I. Gavin, Ph.D., Matthew C. Farrelly, Ph.D., and Joe B. Simpson, Jr.

The authors found that two mandatory Medicaid primary care case management (PCCM) programs were somewhat successful in improving access to primary care among children in the early 1990s. However, the Florida program, in which the PCCM benefit package included Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) services, did not meaningfully increase EPSDT screening visits among preschoolers. Further, the increase seen in New Mexico, where EPSDT was carved out of the PCCM benefit package, was evident for both program participants and non-participants and therefore could not be attributed to the PCCM program.

INTRODUCTION

States are increasingly relying on managed care to both improve access to quality care and control the growth in Medicaid expenditures. As of June 30, 1996, 13.3 million Medicaid beneficiaries—40 percent of all beneficiaries—were enrolled in managed care plans (Health Care Financing Administration, 1997).

One way in which managed care programs promote health and achieve cost savings is by emphasizing primary and preventive care from a single source. Managed care programs provide enrollees a personal doctor or medical home to

increase the continuity of care and potentially reduce the amount of doctor shopping. Providers are given an identifiable population of Medicaid patients with whom they can build ongoing relationships. These relationships improve providers' ability to diagnose and treat medical problems and reduce the occurrence of duplicative diagnostic services and conflicting treatments. Taxpayers then should face lower costs for the publicly insured from the consequent elimination of unnecessary medical services.

Despite their growing popularity, little empirical evidence exists that these programs have been successful in improving access to primary care or increasing the use of preventive care. The evidence on access to primary care available to date is inconclusive. In a review of the impact of early Medicaid managed care (MMC) programs on children's use of services, Freund and Lewit (1993) found that reductions in the use of specialists were not accompanied by commensurate increases in the use of primary care physicians. However, whether this pattern represented improved continuity of care and/or reduced doctor shopping could not be determined.

The results on children's use of preventive care services are equally inconclusive. One study reported that children in MMC were less likely to have had the recommended number of well-child visits compared with children in fee-for-service (FFS) Medicaid (Herz et al., 1996); another found children in Medicaid managed care were more likely (U.S. General

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Accounting Office, 1993); and still others found them equally as likely (Mauldon et al., 1994; U.S. Department of Health and Human Services, 1997). Similarly, studies have shown either a slight trend toward more childhood immunizations (Carey, Weis, and Homer, 1990) or no statistically significant difference between managed care and FFS in the percent of Medicaid children who were up to date in their immunizations (Wood et al., 1994) or the percent who received age-appropriate immunizations during the year (Herz et al., 1996).

Two basic models of managed care dominate the programs adopted by the States: PCCM programs and capitated programs. Under the PCCM programs, beneficiaries choose (or else are assigned) a primary care provider (PCP), who is paid a nominal monthly fee per capita to coordinate care for beneficiaries but who assumes no financial risk for services provided. PCPs and other providers typically are paid on an FFS basis for services they provide. Under the capitated arrangements, managed care plans are paid a flat monthly fee for all or most care received by beneficiaries and assume full financial risk for contracted services. Provider payment is negotiated between the managed care plan and providers and may be some combination of FFS with no financial risk and capitation with full or partial financial risk for services provided.

As of June 1996, 20 States and the District of Columbia had both PCCM and capitated managed care programs for all or some Medicaid beneficiaries, 17 States had only capitated programs, and 11 States had PCCM programs only (Health Care Financing Administration, 1997). Too few studies have been conducted to determine what features or aspects of Medicaid managed care programs lead to improved or reduced access to care or compliance with preventive care standards.

In this article, we look at the PCCM programs in two States—Florida and New Mexico—to assess whether these programs were successful in meeting the goal of increasing access to primary care and the use of preventive care services among Medicaid children. With information from the Florida program, we investigated the impact of implementing a mandatory PCCM program in place of traditional FFS among Medicaid children who declined voluntary coverage under a health maintenance organization (HMO). With the New Mexico program data, we studied the impact of a mandatory PCCM model in a predominantly rural State and among both children in families and disabled Medicaid children in the absence of a well-developed managed care market.

BACKGROUND

Florida

Florida has become a hotbed of managed care development. The State encourages its Medicaid beneficiaries to enroll in HMOs. In addition, under a section 1915(b) waiver in 1991, the State implemented a PCCM program, the Medicaid Physician Access System (MediPass),¹ as the default Medicaid coverage for certain beneficiaries not choosing to enroll in HMOs. These beneficiaries included Aid to Families with Dependent Children (AFDC) cash-assistance recipients, other Medicaid-enrolled families with children, and pregnant women and children enrolled in Medicaid under the State Omnibus Budget Reconciliation Act (SOBRA) poverty-related expansion categories.

The original waiver, which was approved in January 1990, covered a four-county pilot area around Tampa-St. Petersburg,

¹ This program has since been renamed the Medicaid Provider Access System.

including Hillsborough, Manatee, Pasco, and Pinellas Counties. A statewide expansion of MediPass to other counties and eligibility groups was approved in April 1996 for implementation in August 1996. However, this analysis is focused on the early experience of the program in the initial four-county implementation area and the original eligibility groups.

Under MediPass, participants are assigned a PCP based on geographic location, but they may request a different PCP at enrollment and may change PCPs or enroll in an HMO at any time. PCPs can be internists, family practitioners, general practice physicians, or pediatricians. Physician practices, health care clinics, and advanced registered nurse practitioners (ARNPs) and physician assistants (PAs) working under a physician's supervision can also serve as PCPs. PCPs can limit the number of Medicaid beneficiaries they will accept under MediPass, but they cannot exceed the upper limit of 1,500 beneficiaries per physician set by the State. ARNPs and PAs can serve as the PCP for up to 300 clients.

PCPs receive a \$3 case management fee per member per month to cover the costs of coordinating care. PCPs provide primary care and referrals for other covered services for their MediPass patients. In addition, PCPs must provide 24-hour access and outreach to new patients, and they are expected to review monthly utilization reports. Providers are paid on an FFS basis for services they provide. Payment rates increased an average 15 percent over the study period (fiscal year [FY]1991 to FY 1993).²

To encourage preventive care use, the MediPass program covers annual screening visits for adults and EPSDT services

² This increase is based on the weighted average fees for a set of common procedure codes billed for Medicaid children and adults.

for beneficiaries from birth to 20 years of age. Caregivers are encouraged to bring children in for EPSDT screening visits at recommended age intervals. MediPass child beneficiaries and their caregivers receive letters in the mail reminding them when the child's next EPSDT checkup or immunization is due and directing them to call their MediPass PCP to set up an appointment. Each month the State also sends the PCPs lists of MediPass patients assigned to them that indicate the date of the last EPSDT screening visit for each child. As the child's gatekeeper and personal physician, the PCP is responsible for making sure he or she is in compliance with the recommended EPSDT visit and childhood immunization schedule.

However, in FY93, the State's payment rate for an EPSDT visit was \$30, compared with \$50 for a comprehensive office visit. Furthermore, the documentation required of providers for an EPSDT screening visit was greater than that for a comprehensive office visit. The State does not reimburse providers for comprehensive office visits when only well-child care is provided. However, if the child has an illness-related symptom, such as a rash or a cold, a related diagnosis code can be recorded on the bill to ensure payment at the higher comprehensive office visit rate. Unfortunately, we cannot determine from the claims records whether well-child care was delivered or not.

New Mexico

The New Mexico Primary Care Network (PCN) program was a mandatory PCCM model of managed care. Initially implemented in three counties in August 1991, the program was operational statewide by 1995. Before a county could participate in PCN, it had to have at least three PCPs within 25 miles of beneficiaries' residences

among whom Medicaid enrollees could choose. Providers eligible to become PCPs included general practitioners, family practitioners, internists, pediatricians, obstetrician/gynecologists, and clinics with a full-time physician in one of these specialties. Rural health clinics staffed by nurse practitioners or physician assistants could also participate, and specialists could be designated as PCPs for their patients with specialized medical needs if they coordinated care for these patients. Furthermore, Native Americans could choose the Indian Health Service (IHS) as their PCP.

Medicaid enrollees who were required to participate in the PCN program included AFDC and Supplemental Security Income (SSI) recipients, enrollees meeting the categorical requirements of these programs and other State-specific financial criteria, children in two-parent families meeting the State's AFDC financial standards ("Ribicoff children"), and Medicaid enrollees who were eligible under poverty-related expansion categories (pregnant women and young children). Dual Medicare-Medicaid recipients, the institutionalized, foster care children, and those enrolled in other managed care programs were automatically exempt.³

All PCN enrollees must have a designated PCP and primary pharmacy. PCN enrollees could choose their PCP and primary pharmacy from a list of participating physicians, clinics, and pharmacies. A PCP and a primary pharmacy were assigned to PCN enrollees who failed to choose. The assignment was made by an automated program that randomly assigns a provider and pharmacy based on the patient's age, gender, place of residence, and the provider's available number of "slots." Each physician was allowed up to 1,500 slots, and non-physician providers

were allowed up to 300 slots. The automated program attempted to assign a provider/pharmacy within the enrollee's county, but in many cases, a PCP or pharmacy in an adjacent county was assigned. Assignments were originally locked in for 60 days; the length of lock-in was subsequently changed to 6 months.

The PCP received a \$2 case management fee per member per month to cover the costs of coordinating care. Medicaid services covered under the PCP agreement include providing primary care services and referrals for other PCN services, ensuring 24-hour coverage, reviewing utilization reports, maintaining patient medical records, and notifying the Medicaid agency of misuse of services. Providers were paid on an FFS basis for services provided. Payment rates increased 12 percent on average over the study period (calendar year 1990 to calendar year 1993). As in Florida, payment rates for EPSDT visits were lower than those for comprehensive office visits. The \$34.50 payment rate for EPSDT visits did not change over the study period.

EPSDT services were exempt from PCN gatekeeping; they could be provided by any qualified provider. Recognizing that the EPSDT screening rates were below what they should have been, the State hired a media consultant in 1994 to promote the program. They renamed the program Tots to Teens Health Check to give it more visibility and prepared brochures for PCPs and clinics to distribute to Medicaid patients. In addition, they undertook an initiative to develop an automated tracking system that would generate reminder postcards. These changes, however, all took place after our analysis period.

Last year New Mexico dropped its PCN program and implemented a statewide HMO program. Results of that program have yet to be analyzed.

³ There were no Medicaid enrollees in other managed care programs during the analysis years.

METHODOLOGY

To evaluate the use of primary and preventive care among children under Medicaid PCCM programs in Florida and New Mexico, we used a comparative pre/post quasi-experimental research design with Medicaid claims data for the universe of children meeting the PCCM eligibility requirements.⁴ In particular, the study population for both States included all individuals under 18 years of age enrolled in the Medicaid program under PCCM-eligible categories for the majority of their enrollment periods in either the pre- or post-period analysis years. We excluded children whose primary enrollment categories were not PCCM-eligible categories, children who moved from one county to another during the analysis years, and children who enrolled in an HMO and/or were covered by Medicare anytime during the analysis years.

For Florida, we compared the experience of MediPass-eligible Medicaid children in the four-county pilot area around Tampa-St. Petersburg with the experience of children enrolled in Medicaid under the same eligibility groups in four comparable non-waiver counties around Orlando. These counties were chosen as the comparison group because they best matched the pilot counties in terms of location in central Florida, size, and HMO penetration. The pre-implementation period was FY91 (running from July 1990 to June 1991) and the post-period was FY93 (running from July 1992 to June 1993). We excluded all children voluntarily enrolled in Medicaid HMO plans. Thus, we estimated the impact of implementing a mandatory PCCM program in place of tra-

ditional FFS among Medicaid children who decline voluntary HMO coverage.

For New Mexico, we compared the experience of children in PCN-eligible eligibility categories in 19 non-metropolitan counties that had implemented the program prior to 1993 with the experience of children in the same eligibility groups in 10 non-metropolitan counties that had implemented the program after 1993 (later referred to as non-waiver counties). The pre-period was calendar year 1990, the year just prior to implementation of PCN in the State, and the post-period was calendar year 1993. In all analyses, we examine the experience of children enrolled in Medicaid under SSI-related eligibility categories (the disabled) and those enrolled in AFDC and other non-SSI related categories (the non-disabled) separately.

The data sources for this investigation were claims and enrollment data files from the Florida and New Mexico Medicaid Management Information Systems (MMIS). We created a uniform person-level file structure and mapped information from the individual claims records into person-level records for each enrollee. In particular, we identified ambulatory care days and inpatient care stays and characterized each by provider type, place of service, reason for care, and/or types of services received. We then accumulated the events to the person level to provide detailed counts of use in an individual utilization history. The data were completely comparable for individuals in waiver and non-waiver counties within each State.

For this analysis, we investigated measures of both primary care access and preventive care use. These measures, how they were computed, and the expected impact of the PCCM program on each are described in the next section.

⁴ For a description of the comparative pre/post quasi-experimental research design, see Mohr (1995).

Primary Care Measures

Access is difficult to measure with claims data. Claims data provide measures of service use, which reflect not only the availability and accessibility of services but also the aggressiveness of outreach and education efforts and are confounded by levels of medical need and other unobserved factors. Therefore, results from the claims data analysis can only provide evidence supporting or refuting improved access to care but cannot be used to definitively prove the success of the program in meeting this goal.

We were able to construct several measures from the claims data files that were indicative of access to care. First, we hypothesized that enrollees with compromised access to care would forgo routine primary care. Therefore, although an increased percentage of beneficiaries with ambulatory days of care alone would not necessarily be representative of improved access, in combination with other measures it would indicate at least that access had not deteriorated under the program.

Second, we hypothesized that enrollees with compromised access to routine care would be more likely to enter the health care system through hospital emergency rooms (ERs). We investigated the impact of the PCCM program on the likelihood that children had ER visits for any diagnosis during the year. In our multivariate investigation of the likelihood of ER visits, we restricted the observations to beneficiaries with some ambulatory care during the year.

Third, we hypothesized that enrollees with compromised access to routine care would be more likely to experience preventable hospitalizations for ambulatory care sensitive conditions (ACSCs). Therefore, we also investigated the impact of the PCCM program on the likelihood

that children had any ACSC hospitalizations during the year. To identify ACSC hospitalizations, we developed a list of 35 ACSCs relevant to a Medicaid population. This list and the diagnosis codes and other restrictions used to identify ACSC hospitalizations for the study are provided in Table 1.

Thus, in both States, we were looking for a pattern of greater increases in ambulatory care days and greater declines in ER visits and ACSC hospitalizations from the pre- to the post-period in the waiver counties compared with the non-waiver counties. We hypothesized that such a pattern would indicate increased access to primary care.

Finally, the New Mexico claims data contain records with State-specific codes for EPSDT screening visits. One of these codes indicates whether the EPSDT provider referred the child for further diagnosis and treatment. Although EPSDT screening and enhanced services are exempt from the PCCM, the requirement for other referrals to be made through the PCP could nevertheless affect the frequency with which children were referred for further diagnosis and treatment of problems discovered during EPSDT screening visits. Equivalent or increased referrals among program participants compared with non-participants would show that access to necessary followup care is at least not being restricted by EPSDT providers.

Preventive Care Measures

The success of the MediPass program in promoting preventive care among preschoolers was easier to measure with claims data because of the age-specific guidelines for receipt of such care. We computed the receipt of age-appropriate EPSDT screening visits among children under 6 years of age.

Table 1
Ambulatory Care Sensitive Conditions

Ambulatory Care Sensitive Condition	ICD-9 Code ¹	Additional Restrictions
1. Congenital Syphilis	090	—
2. Bacterial Meningitis	032	—
3. Polio	045	—
4. Measles	055	—
5. Mumps	072	—
6. Whooping Cough	033	—
7. Tetanus	037	—
8. Hemophilus Meningitis	320.0	Age 1-5 only
9. Hepatitis B	070.2, 070.3	—
10. Chicken Pox	052	—
11. Rheumatic Fever	390, 391	—
12. Chronic Obstructive Pulmonary Disease	491, 492, 494, 496	—
13. Bacterial Pneumonia	481, 482.2, 482.3, 482.9, 483, 485, 486	466.0 only with a secondary diagnosis of 491, 492, 494, or 495 Exclude cases with secondary diagnoses of 282.6 (sickle cell) among patients under 2 months of age and secondary diagnoses of 493 (asthma) Include cases with 493 as a primary diagnosis or as a secondary diagnosis for primary diagnosis of 466, 480-483, 485-487, 518.8, 786.0 Exclude 402.0 (hypertension) and exclude all cases with the following surgical procedures: 36.01, 36.02, 36.05, 36.1, 37.5, 37.7
14. Asthma	493	—
15. Congestive Heart Failure	428, 402.01, 402.11, 402.91	—
16. Hypertension	401.0, 402.0, 403.0, 404.0, 405.0, 437.2	Exclude cases with the following surgical procedures: 36.01, 36.02, 36.05, 36.1, 37.5, 37.7 Exclude cases with the following procedures: 01-86.99, except 86.0 where it is the only surgical procedure listed
17. Cellulitis	681, 682	—
18. Diabetes A	250.1, 250.2, 250.3	—
19. Hypoglycemia	251.2, 251.0 with E932.3	—
20. Kidney/Urinary Tract Infection	590, 599.0, 599.9	—
21. Dehydration, Primary Diagnosis	276	—
22. Dehydration, Secondary Diagnosis	276	—
23. Dental Conditions	521, 522, 523	—
24. Iron-Deficiency Anemia	280.1, 280.9	—
25. Failure to Thrive	783.4	—
26. Pelvic Inflammatory Disease	614, 615, 616.0	—
27. Perforated/Bleeding Ulcer	531, 532, 533	—
28. Late Diagnosis Breast Cancer	174-174.9 with 198-198.9	—
29. Late Diagnosis Cervical Cancer	180-180.9 with 198-198.9	—
30. Decubitus Ulcer	707	—
31. Gangrene	785.4	—
32. Drug Toxicity/Side Effects	995.2, E930-E949	—
33. Metabolic Disorders	270	Age < 8 Weeks
34. Jaundice	774.0-774.7, 773.0-773.2, 773.4-773.5	Age > 2 Days and < 6 weeks
35. Feeding Difficulties	783.2-783.4	Age < 8 weeks

¹ If only a three-digit code is provided, then all four- and five-digit codes beginning with the three digits in the three-digit code are included as well.

NOTE: ICD-9 is *International Classification of Diseases, 9th Revision*.

SOURCE: Swigonski, N., Indiana University Medical Center, Bloomington, IN, 1996.

EPSDT screening visits are comprehensive well-child visits. States must have a recommended periodicity schedule for EPSDT screening visits. In many States, including Florida and New Mexico, this schedule is identical to the American Academy of Pediatrics (AAP) schedule for health supervision visits (Orloff, Rivera, and Rosenbaum, 1992). The AAP schedule recommends six visits in the child's first year of life, three visits in the child's second year, an annual visit from ages 3 to 6 years, and a visit every other year from ages 7 to 20 years.

To assess the extent to which Medicaid-enrolled children were in compliance with the AAP-recommended periodicity schedule for health supervision visits, we computed a visit completion rate for preschool-aged children from the claims data. To derive this value, we first determined the recommended number of screening visits for a child enrolled for the full 12 months of the analysis year based on the AAP periodicity schedule and the age of the child at the end of the year. We then adjusted this value for the child's duration of Medicaid enrollment during the year by multiplying the number of recommended visits by the fraction of the year that the child was enrolled in Medicaid, or if the child was under 12 months of age, the fraction of the child's life during which s/he was enrolled. This methodology assumes that a child was equally likely to have a visit during a month in which s/he was enrolled as during a month in which s/he was not enrolled. Thus, the expected number of visits, \bar{S}_{ij} , for the i th child in the j th age group is:

$$\bar{S}_{ij} = \frac{\text{Months Enrolled}_{ij}}{M_{ij}} \times \frac{\text{Number of Recommended Visits}_j}{}$$

where M_{ij} is 12 if the child was 12 months of age or over and equals the number of months

from birth to the end of the year if the child was under 12 months of age. The sum of this measure over children in the analysis was the denominator for the visit rate.

The numerator of the visit rate was the sum of the smaller of the total number of well-child visits children had during the year (i.e., S_{ij}) or the expected number of visits rounded up to the nearest integer (e.g., $\text{CEIL}[\bar{S}_{ij}]$).⁵ We included visits coded as EPSDT visits and other visits with well-child visit diagnostic and/or procedure codes. However, very few of these "shadow" EPSDT visits were found in the Florida and New Mexico claims files.

$$\begin{aligned} \text{Visit Rate} &= \frac{\text{Actual Number of Visits}}{\text{Expected Number of Visits}} \times 100 \\ &= \frac{\sum_j \sum_i S_{ij}}{\sum_j \sum_i \bar{S}_{ij}} \times 100 \end{aligned}$$

Thus, the visit completion rate shows the percent of total recommended (expected) visits children actually had. We expect children with assigned PCPs under the PCCM programs to have completed a greater percentage of recommended visits and to have been more likely to be in compliance with the AAP guidelines compared with children in FFS Medicaid.

Analytic Techniques

We performed both tabular descriptive and multivariate probit analyses of the selected primary and preventive care measures. In both analyses, program impact was measured as the difference in the changes from the pre- to the post-imple-

⁵ Medicaid law allows interperiodic screening visits for children under the EPSDT program. Therefore, children may have more than the recommended number of visits. So that we do not count these extra visits in our index, we have capped the visits counted for each child at the expected number of visits rounded up to the next highest integer.

mentation periods between the PCCM waiver and non-waiver counties.

Descriptive Analysis

We first compared the probability and levels of service use among beneficiaries in the different county groups and within county groups over time. Then we compared the changes over time across the county groups (i.e., the difference in differences [DD]). Only by this last comparison, which controls for the independent effects of both secular trends and initial differences between the county groups, could we tell whether the PCCM programs had meaningful impacts on primary and preventive care use.

The DD is measured by subtracting the change in the measure of interest from the pre- to the post-period in the comparison counties (*C*) from the change in the measure from pre- to post-period in the waiver counties (*W*):

$$DD = (Y_{post \cdot W} - Y_{pre \cdot W}) - (Y_{post \cdot C} - Y_{pre \cdot C})$$

A positive sign indicates that the measure increased more (or decreased less) in the waiver counties than in the non-waiver counties, and a negative sign indicates that it decreased more (or increased less) in the waiver counties compared with the non-waiver counties. If an increase in the measure is considered a desirable program effect, as in the case of preventive care, then we are looking for a positive sign on the DD. Alternatively, if a decrease in the measure is considered a desirable program effect, as in the case of ER visits and ACSC hospitalizations, then we are looking for a negative sign on the DD.

Multivariate Analysis

A limitation of the tabular analysis is that it fails to control for other factors that may

influence service use and costs (e.g., age, race, gender, enrollment duration). During the study period, both States experienced significant growth and changes in the composition of the child populations enrolled in Medicaid under categories eligible for the PCCM programs. These differences in the characteristics of children in the waiver and non-waiver counties and within county groups over time point to the need to conduct multivariate analyses for estimating the PCCM program impact. Therefore, we extended our bivariate analysis to multivariate probit analysis.

The basic analytic model is:

$$Y_{it} = f(\alpha + \gamma_T Tt + \gamma_W W_{it} + \gamma_{TW} TW_{it} + \beta X_{it} + u_{it})$$

where *Y* is the dependent variable, *Y* = 1 indicates the child was in compliance with the periodicity schedule, and *Y* = 0 indicates he/she was not;

i indexes the individual.

t indexes the year.

X is a vector of regressors that vary over time and across people.

W indicates if the person lived in a waiver county (*W* = 1) or a comparison county (*W* = 0).⁶

T indicates if the observation is for the post-period (*T* = 1) or the pre-period (*T* = 0).

The program effect is estimated by the coefficient of the indicator variable *TW* that represents the interaction of the pre/post indicator *T* and the waiver/comparison group indicator *W*. This coefficient measures the difference between the waiver and non-waiver groups in the change in the outcome measure over time, holding constant *X*, i.e.,

$$\gamma_{TW} = [(\bar{Y}_{T=1, W=1} - \bar{Y}_{T=0, W=1}) - (\bar{Y}_{T=1, W=0} - \bar{Y}_{T=0, W=0})]$$

⁶ In practice, the *W* variable was replaced by county fixed-effect (dichotomous) variables, which controlled for other unobservable county-specific factors, as well as being a waiver county.

Table 2
Percent of Child Beneficiaries in Waiver Counties During the Post Period, by Level of Participation in the PCCM Program

Level of Participation	Florida Fiscal Year 1993		New Mexico 1993	
	AFDC and Other Non-SSI		AFDC and Other Non-SSI	SSI
Delayed PCCM Participation	30.2		24.3	17.7
Full PCCM Participation	23.1		31.5	37.6
Disenrolled from PCCM	12.9		18.6	14.1
Non-Participant in PCCM	33.8		25.6	30.6

NOTES: PCCM is primary care case management. AFDC is Aid to Families with Dependent Children. SSI is Supplemental Security Income.

SOURCE: Data from the Florida and New Mexico Medicaid Management Information Systems; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

or the difference in differences. Entered as such it measures the net overall impact of the PCCM program on the population included in the regression.

In the tables of summary results, we present normalized probit estimates of the coefficients of the program impact variable (*TW*).⁷ These estimates represent the percentage-point change in the dependent variable for a change in *TW* from 0 to 1 and therefore are the analogue to the DD estimate in the descriptive analysis.⁸

Even though the PCCM programs were mandatory in Florida and New Mexico for all beneficiaries enrolled under the study eligibility categories and not enrolled in an HMO, we found a significant number of eligible Medicaid beneficiaries in both States covered under Medicaid FFS for all or part of the post-period analysis years. As shown in Table 2, one-third of Florida's PCCM-eligible child beneficiaries, one-quarter of New Mexico's AFDC and other non-SSI

child beneficiaries, and more than 30 percent of New Mexico's SSI child beneficiaries in waiver counties had no PCCM coverage in the post-period. Significant proportions of the remaining child beneficiaries in each analysis group either were covered in FFS for 1 or more months before being enrolled in the PCCM program or were initially enrolled in the PCCM program and then disenrolled and had FFS coverage for the remainder of their Medicaid enrollment. Reasons for these PCCM enrollment gaps include time required to complete the enrollment and PCP assignment processes, which can take several months, and enrollment under ineligible categories for part of the year. In addition, New Mexico granted exemptions for "good cause," which included special medical needs and lack of a PCP close to the beneficiary's residence.

Because the program impact was expected to vary by the level of participation (or exposure) to the program, we reran each equation replacing the *TW* variable with indicator (dichotomous) variables for four mutually exclusive categories of PCCM participation: (1) delayed enrollees are beneficiaries who were covered under Medicaid FFS prior to their PCCM enrollment in the analysis year; (2) full-period enrollees are beneficiaries who were enrolled in PCCM for all the months they were enrolled in Medicaid during the analysis year; (3) disenrollees are benefi-

⁷ Normalized probit estimates are calculated for the *j*th variable as $\beta_j \phi(z)$, where $z = \Phi^{-1}(p)$, *p* is the sample mean of the response variable, Φ^{-1} is the inverse of the standard normal cumulative density function, and β_j is the probit coefficient for the variable. The change in probability for changes in dichotomous variables is calculated for a discrete change of the dichotomous variable from 0 to 1. The normalized coefficient for a continuous variable is the incremental change in the probability of enrolling in PCCM for an infinitesimal change in the independent variable.

⁸ The scale and interpretation of the descriptive and multivariate estimates of program impact are exactly the same for all measures, except EPSDT screening visits. For this latter measure, the descriptive measure is the percentage-point difference in the percent of completed screening visits among visits recommended for all children in the aggregate, and the multivariate measure is the percentage-point difference in the percent of children in compliance with the recommendations.

Table 3
Independent Variables Used in the
Multivariate Probit Analyses

Demographic Variables

- Age and Age Squared
- Gender
- Race/Ethnicity
 - Florida: White, Hispanic, Black, and Other
 - New Mexico: White, Hispanic, Native American, and Other

Medicaid Eligibility and Enrollment Variables

- Number of Months Enrolled in Medicaid During Year
- Eligibility Category
 - Florida: AFDC Cash-Assistance, Poverty-Related Expansion, and Other Non-Cash
 - New Mexico: AFDC, SSI, and Other (SOBRA)
- Post-Period Indicator Variable
- Interaction Term Between the Post-Period Indicator Variable and Poverty-Related Expansion Indicator Variable

County-Level Supply and Demand Variables

- County Fixed Effects
- Number of Primary Care Physicians per 100,000 Population (New Mexico Only)

Program Effect

- Interaction Between the Post-Period Indicator and the Indicator for Residence in a Waiver County
 - PCCM Participation (Full, Delayed, Disenrolled, and Not Participating)
-

NOTES: AFDC is Aid to Families with Dependent Children. SSI is Supplemental Security Income. SOBRA is State Omnibus Budget Reconciliation Act. PCCM is primary care case management.

SOURCE: Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

ciaries who disenrolled from PCCM and subsequently had at least 1 month of Medicaid FFS coverage before the end of the analysis year; and (4) non-participants are beneficiaries who were covered under Medicaid FFS during their entire Medicaid enrollment period in the analysis year.⁹ We present both the aggregate waiver impact and the differential impacts by level of participation.

In both sets of equations, we controlled for demographic factors, including age, gender, and race; Medicaid eligibility category (e.g., poverty-related expansion coverage) and enrollment duration; and county-level variations in supply and demand with county fixed effects and, in New Mexico, the number of PCPs per 100,000

⁹ Beneficiaries who enrolled in the PCCM program in the post-period after their first month of Medicaid enrollment that year (i.e., delayed enrollees) and who subsequently disenrolled before the end of the Medicaid enrollment period in the analysis year are classified as disenrollees.

population. A full list of the independent variables used in the multivariate equations is provided in Table 3.

RESULTS

Because of the many differences in the characteristics of the PCCM and Medicaid programs, the covered populations, the medical care systems serving these populations, and the geographic settings, we present the results of the two programs separately in the next section. The New Mexico results are further broken out for SSI enrollees and other enrolled children in families because of the very different health care needs of these two beneficiary groups. We begin each section with a description of the study population and then present the results of our investigation of program impact on access to primary care and use of EPSDT services, respectively.

Florida

Study Population Characteristics

In Florida's section 1915(b) waiver counties, the number of MediPass-eligible Medicaid children increased nearly 30 percent, from 94,696 in FY91 to 122,719 in FY93 (Table 4). The number of children enrolled in Medicaid under MediPass-eligible categories in the four non-waiver counties increased a smaller 22 percent from 63,124 to 76,725 during the study period.

Children in the two county groups had comparable distributions over age, gender, Medicaid enrollment duration, and eligibility categories. However, proportionately more children were white and proportionately fewer children were Hispanic or black in the waiver counties, compared with children in the non-waiver counties.

Over time, the distribution of children in MediPass-eligible categories in both county

Table 4
Characteristics of Children Enrolled in Medicaid Under AFDC and Other MediPass-Eligible
Categories: Florida, Fiscal Years 1991 and 1993

Characteristics of Children	Waiver Counties		Non-Waiver Counties	
	FY 1991	FY 1993	FY 1991	FY 1993
Number of Children	94,696	122,719	63,124	76,725
Age			Percent	
0-2 Years	38.4	36.2	37.2	36.3
3-5 Years	21.2	20.9	22.0	20.5
6-17 Years	40.4	42.9	40.8	43.2
Gender				
Female	46.6	48.9	45.6	48.7
Male	53.4	51.1	54.4	51.3
Race				
White	49.8	51.7	36.4	42.6
Hispanic	14.0	15.2	18.6	21.4
Black	33.2	29.9	42.1	32.4
Other	3.0	3.2	2.9	3.6
Medicaid Enrollment Duration				
1-3 Months	8.8	7.9	7.5	8.9
4-8 Months	15.5	18.7	13.0	19.2
9-11 Months	10.9	16.0	10.1	14.9
12 Months	64.8	57.4	69.5	57.0
Eligibility Category				
Cash-Assistance Related	74.9	72.2	74.7	69.7
Poverty-Related Expansion	25.1	27.8	25.3	30.3

NOTES: AFDC is Aid to Families with Dependent Children. FY is fiscal year.

SOURCE: Data from the Florida Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

groups became slightly older, more female, and more white. In addition, proportionately fewer children were enrolled for the full year or under AFDC cash-assistance categories in FY93 than in FY91. These changes result from the increasing number of children eligible under poverty-related expansion categories.

Program Impact

Several indicators suggested that children had slightly improved access to primary care under the MediPass program in FY93. The percentage-point increase in children with any ambulatory care days and the percentage-point declines in children with ER visits and children with ACSC hospitalizations were significantly greater among program participants but small in magnitude. On the other hand,

the MediPass program had little, if any, success in realizing increased use of EPSDT services; we found virtually no meaningful program effects on EPSDT screening visits among preschoolers.

Ambulatory Care Days

In FY91, approximately one-half of all children enrolled in Medicaid under MediPass-eligible categories had at least 1 day of ambulatory care in both waiver and non-waiver counties (Table 5). The percent of children with any ambulatory care increased from FY91 to FY93 in both county groups. The increase was almost 2 percentage points greater in waiver counties than in non-waiver counties: 9.6 percentage points versus 7.7 percentage points.

The multivariate results, shown in Table 6, agree with the descriptive results. After

Table 5

Use of Selected Primary and Preventive Care Services Among AFDC and Other MediPass-Eligible Medicaid Beneficiaries: Florida, Fiscal Years 1991 and 1993

Service	Waiver Counties		Non-Waiver Counties		Difference in Differences	t-Statistic
	FY 1991	FY 1993	FY 1991	FY93		
Any Ambulatory Care Days (0-17 Years)	51.5	61.1	49.0	56.7	**1.9	5.66
Any Emergency Room Visits (0-17 Years)	43.2	31.9	44.4	40.6	** -7.5	-16.17
Any ACSC Hospital Stays (0-17 Years)	1.9	1.5	1.7	1.8	** -0.5	-4.81
EPSDT Visits (2-60 Months)	21.4	25.4	15.8	19.0	**0.8	3.18

** $p \leq 0.001$

NOTES: FY is fiscal year. AFDC is Aid to Families with Dependent Children. ACSC is ambulatory care sensitive condition. EPSDT is Early and Periodic Screening, Diagnostic, and Treatment services.

SOURCE: Data from the Florida Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

controlling for demographic, Medicaid enrollment, and county-level characteristics, we found a 1.8-percentage point greater increase among all MediPass-eligible children in waiver counties. Breaking the effect out by level of participation in the PCCM program, we found that full PCCM participants were 21.1 percentage points more likely to have had any ambulatory care, whereas non-participants in the PCCM counties were 28.6 percentage points less likely to have had any ambulatory care.

Emergency Room Visits

An equal percent of children in Florida waiver and non-waiver counties had ER visits during FY91 (Table 5). Although declines in this percentage occurred in both county groups from FY91 to FY93, the decline in the waiver counties exceeded the decline in the non-waiver counties by 7.5 percentage points.

The multivariate analyses again agree with the descriptive results, showing an 8.8-percentage-point greater decline in the percent of waiver-county children in MediPass-eligibility categories with ER visits (Table 6). In contrast to the results for ambulatory care days, the decline in ER use was evident among both participants

and non-participants of the MediPass program. However, full-period participants had the greatest DD (an 11.2-percentage-point greater decline) and non-participants had the smallest difference (a 6.2-percentage-point greater decline).

Hospital Stays for ACSCs

An ACSC was given as either the primary or secondary diagnosis for one-third to one-half of all hospitalizations among the study children. Nevertheless, because this population has few hospital episodes, only 1.9 percent of MediPass-eligible children in waiver counties and 1.7 percent of Medicaid children enrolled under MediPass-eligible categories in non-waiver counties had any hospitalizations for ACSCs in FY91 (Table 5).

The percent of children with ACSC hospitalizations declined only in the waiver counties. As a result, the difference in this measure between waiver and non-waiver counties widened by 0.5 percentage points. In FY93, only 1.5 percent of MediPass-eligible children in waiver counties had ACSC hospital stays.

The multivariate analysis shows a smaller but statistically significant 0.1-percentage-point DD between the two county

Table 6

Standardized Probit Coefficients for the Differences in the Probability of the Use of Selected Primary and Preventive Care Services Among AFDC and Other MediPass-Eligible Medicaid Children in Waiver Counties, Florida: Fiscal Year 1993

Status	Any Outpatient Days of Care ¹		Any Emergency Room Visits ^{1,2}		Any Hospital Stays for ACSs ¹		Compliance With EPSDT Screening Visits ³	
	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic
All Children in Waiver Counties	** .018	5.22	** -.088	-17.80	** -.001	-3.19	* -.008	-2.77
Delayed PCCM Participation	** .162	39.73	** -.082	-15.15	** -.001	-3.87	-.000	-0.11
Full PCCM Participation	** .211	49.31	** .112	-19.81	** -.001	-3.79	** .017	4.96
Disenrolled from PCCM	** .185	36.58	** .072	-11.08	-.001	-2.01	-.003	-0.72
Non-Participant in PCCM	** .286	-70.63	** .062	-9.61	.000	0.03	** .043	-14.70
Number of Observations	356,757	—	197,925	—	356,757	—	168,735	—

* $p \leq 0.01$

** $p \leq 0.001$

¹ Observations for this equation were restricted to children 0-17 years of age.

² Observations for this equation were restricted to children with some ambulatory care days.

³ Observations for this equation were restricted to children 2-60 months of age.

NOTES: AFDC is Aid to Families with Dependent Children. ACSC is ambulatory care sensitive condition. EPSDT is Early and Periodic Screening, Diagnostic, and Treatment services. PCCM is primary care case management.

SOURCE: Data from the Florida Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

Table 7
Characteristics of Children Enrolled in Medicaid Under AFDC and Other Non-SSI PCN-Eligible Categories, New Mexico: 1990 and 1993

Characteristic	Waiver Counties		Non-Waiver Counties	
	1990	1993	1990	1993
Number of Children	22,589	37,695	19,299	33,585
	Percent			
Age				
0-2 Years	32.4	28.3	29.5	26.5
3-5 Years	24.7	26.8	24.0	27.3
6-17 Years	42.9	44.9	46.4	46.3
Gender				
Female	49.1	49.5	49.8	49.9
Male	50.9	50.5	50.2	50.1
Race				
White	25.0	25.2	27.1	22.5
Hispanic	59.6	63.8	31.3	31.4
Native American	9.7	4.3	31.3	22.6
Other	5.7	6.7	10.3	23.4
Medicaid Enrollment Duration				
1-3 Months	18.8	13.9	21.4	15.0
4-8 Months	27.5	24.9	27.5	26.7
9-11 Months	12.8	13.8	12.6	14.9
12 Months	40.9	47.4	38.5	43.4
Eligibility Category				
Cash-Assistance Related	68.3	58.9	75.5	62.0
Poverty-Related Expansion	31.7	41.1	24.5	38.0

NOTES: AFDC is Aid to Families with Dependent Children. SSI is Supplemental Security Income. PCN is Primary Care Network.

SOURCE: Data from the New Mexico Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

groups (Table 6). All of the estimated drop in ACSC hospitalizations was concentrated among program participants.

EPSDT Screening Visits

In FY91, only 21.4 percent of recommended EPSDT visits were completed by preschool-aged children in the waiver counties, and even fewer visits, 15.8 percent of those recommended, were completed by preschoolers in the non-waiver counties. Although this percentage increased in both county groups from FY91 to FY93, with a slightly higher increase in the waiver counties, the increases were very small. The estimated program impact for waiver counties in the descriptive analysis was less than a 1-percentage-point increase in the percent of recommended EPSDT visits completed among MediPass-eligible children under 6 years of age.

The multivariate analysis shows a 0.8-percentage-point relative decline in the percent of recommended screening visits completed among preschoolers in the waiver counties. However, the decline was concentrated among non-participants. Full-period program participants had a 1.7-percentage-point greater increase in the percent of recommended visits completed.

New Mexico Non-Disabled

Study Population Characteristics

In New Mexico, AFDC and other non-SSI Medicaid children in the 19 non-metropolitan counties that had implemented the section 1915(b) waiver program before 1993 grew by two-thirds from 1990 to 1993, from 22,589 to 37,695 (Table 7). In the 10 non-metropolitan counties that had not

Table 8

Use of Selected Primary and Preventive Care Services Under Medicaid Among AFDC and Other Non-SSI PCN-Eligible Beneficiaries, New Mexico: 1990 and 1993

Service	Waiver Counties		Non-Waiver Counties		Difference in Differences	t-Statistic
	1990	1993	1990	1993		
Any Ambulatory Care Days (0-17 Years)	68.1	76.5	59.5	68.6	-0.7	-1.12
Any Emergency Room Visits (0-17 Years)	24.4	27.3	22.2	28.2	**3.1	-4.66
Any ACSC Hospital Stays (0-17 Years)	1.7	2.0	1.4	2.0	*-0.3	-2.5
EPSDT Visits (2-60 Months)	44.7	54.4	30.9	36.7	**3.9	7.89
EPSDT Referrals (0-17 Years)	10.5	24.3	12.8	19.9	**6.7	5.95

* $p \leq 0.01$

** $p \leq 0.001$

NOTES: AFDC is Aid to Families with Dependent Children. SSI is Supplemental Security Income. ACSC is ambulatory care sensitive condition. EPSDT is Early and Periodic Screening, Diagnostic, and Treatment services. PCN is Primary Care Network.

SOURCE: Data from the New Mexico Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

implemented the program until after 1993, the non-disabled Medicaid child population grew by nearly three-quarters, from 19,299 to 33,585.

The non-disabled child population in the waiver counties was slightly younger than in the non-waiver counties. In addition, proportionately more Hispanic persons and fewer Native Americans resided in the waiver counties compared with the non-waiver counties. Finally, children in the waiver counties were slightly more likely to be enrolled in Medicaid for the full year and to be enrolled under the poverty-related expansion categories compared with children in the non-waiver counties. During the study period, the non-disabled Medicaid child population in both county groups became slightly older on average and were more likely to be in poverty-related expansion categories and to be enrolled for the full year.

Program Impact

All New Mexico Medicaid children enrolled under AFDC and other non-SSI eligibility categories had greater access to care in 1993 than in 1990, as reflected in higher health care service use. However, service use increased for all service types, including hospital ER visits and ACSC hos-

pitalizations. We would expect these latter services to decline for beneficiaries with improved access to primary care.

Compared with non-waiver counties, increases were smaller for ER visits and ACSC hospital stays and larger for EPSDT visit completion rates among full-period PCCM participants in waiver counties. Thus, a small, but significant, program impact was found for AFDC and other non-SSI child beneficiaries in 1993.

Ambulatory Care Days

A higher percentage of waiver-county children in New Mexico had ambulatory care days compared with children in the non-waiver counties (Table 8). The percent of children with any ambulatory care rose by more than 8 percentage points from 1990 to 1993 in both county groups, with a slightly higher increase in the non-waiver counties. Nevertheless, the percent of children with ambulatory care remained significantly higher in waiver counties compared with non-waiver counties in 1993: 76.5 percent versus 68.6 percent.

The multivariate results confirm a greater increase in AFDC and other non-SSI Medicaid children with ambulatory care among children in non-waiver counties (Table 9). However, the difference in

Table 9

Standardized Probit Coefficients for the Differences in the Probability of Use of Selected Primary and Preventive Care Services Among AFDC and Other Non-SSI PCN-Eligible Medicaid Children in Waiver Counties, New Mexico: 1993

Status	Any Outpatient Days of Care ¹		Any Emergency Room Visits ^{1,2}		Any Hospital Stays for ACSCs ¹		Compliance with EPSDT Screening Visits ³		Any Referrals During EPSDT Visits ¹	
	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic
All Children in Waiver Counties	**-.030	-4.48	**-.035	-4.77	*-.003	-2.61	.004	0.48	**0.069	6.59
Delayed PCCM Participation	-.008	-0.96	**-.037	-4.47	*-.003	-2.41	-.009	-0.88	**0.058	4.70
Full PCCM Participation	-.009	-1.11	**-.032	-4.01	*-.004	-2.99	**0.046	4.17	**0.077	6.25
Disenrolled from PCCM	-.011	-1.25	**-.037	-4.24	-.002	-1.50	*.037	3.17	**0.059	4.53
Non-Participant in PCCM	**-.081	-9.99	**-.031	-3.42	-.003	-1.85	**-.038	-3.68	**0.104	7.66
Number of Observations	112,577	—	78,341	—	112,577	—	52,077	—	34,816	—

* $p < 0.01$.

** $p < 0.001$.

¹ Observations for this equation were restricted to children 0-17 years of age.

² Observations for this equation were restricted to children with some ambulatory care days.

³ Observations for this equation were restricted to children 2-60 months of age.

NOTES: AFDC is Aid to Families with Dependent Children. SSI is Supplemental Security Income. PCN is Primary Care Network. ACSC is ambulatory care sensitive condition. PCCM is primary care case management. EPSDT is Early and Periodic Screening, Diagnostic, and Treatment services.

SOURCE: Data from the New Mexico Medicaid Management Information System analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

the increases was statistically significant only for non-participants of the PCCM program. No statistically significant DD was found for program participants.

Emergency Room Visits

In 1990 fewer than one-quarter of Medicaid children enrolled under AFDC and other non-SSI categories had any ER visits paid for by Medicaid during the year. However, this percentage rose to 27.3 percent in the waiver counties and to 28.2 percent in the non-waiver counties in 1993 (Table 8). Because the percentage point increase in ER visits was somewhat higher in non-waiver counties than in waiver counties in 1990, the estimated program impact was a decline of more than 3 percentage points.

After controlling for demographic, Medicaid enrollment, and county-level factors in the multivariate probit analysis, the estimated program effect remained at a statistically significant 3.5-percentage-point decline (Table 9). However, the relative decline was prevalent among both PCCM participants and non-participants in the waiver counties.

Hospital Stays for ACSCs

In 1990 a slightly higher percentage of these Medicaid children had ACSC hospital stays in the waiver counties than in the non-waiver counties in New Mexico (Table 8). Both the waiver and non-waiver counties in New Mexico experienced increases in the percent of children with ACSC hospitalizations from 1990 to 1993. However, the increase in this percentage was slightly lower in the waiver counties. By 1993, 2.0 percent of AFDC and other non-SSI Medicaid children in New Mexico had a hospitalization for an ACSC during the year.

The multivariate probit analysis shows a statistically significant 0.3-percentage-point smaller increase in the percent of children with ACSC hospitalizations (Table 9). Thus, estimated program impacts for ER visits and ACSC hospitalizations had the expected signs. However, both of these services were more prevalent in 1993 than in 1990 before the implementation of the PCCM program.

EPSDT Screening Visits

Preschool-aged children in the New Mexico waiver counties had higher EPSDT visit completion rates than preschoolers in non-waiver counties in both analysis years (Table 8). The percentage of recommended visits that were received by preschool-aged Medicaid children enrolled under AFDC and other non-SSI categories grew significantly in both county groups from 1990 to 1993, with the greatest increase in the waiver counties. In 1993 these Medicaid children in waiver counties had 54.4 percent of recommended EPSDT visits, whereas in non-waiver counties they had 36.7 percent of recommended visits.

The multivariate results show no statistically significant impact of the PCCM program at the aggregate level (Table 9). However, in the equations that broke out the impact by the level of participation, we found that program participants enrolled for their full Medicaid enrollment period in 1993 completed 4.6 percentage points more of the recommended screening visits, whereas non-participants had 3.8-percentage-points fewer visits.

Referrals for Further Diagnosis and Treatment

In 1990 among children enrolled in Medicaid under AFDC and other non-SSI

Table 10
Characteristics of Children Enrolled in Medicaid Under SSI-Related Categories,
New Mexico: 1990 and 1993

Characteristic	Waiver Counties		Non-Waiver Counties	
	1990	1993	1990	1993
Number of Children	637	1,426	548	1,190
Age			Percent	
0-2 Years	6.1	6.9	8.4	6.0
3-5 Years	14.8	15.6	17.7	19.1
6-17 Years	79.1	77.5	73.9	74.9
Gender				
Female	42.9	39.2	43.3	39.9
Male	57.1	60.8	56.7	60.1
Race				
White	35.9	31.1	26.3	23.4
Hispanic	14.8	19.1	30.5	38.4
Native American	25.1	34.1	14.0	20.1
Other	24.2	15.7	29.2	18.1
Medicaid Enrollment Duration				
1-3 Months	5.6	6.5	6.0	6.4
4-8 Months	11.3	10.2	8.0	10.4
9-11 Months	5.5	8.3	8.8	7.9
12 Months	77.6	74.9	77.2	75.3

NOTE: SSI is Supplemental Security Income.

SOURCE: Data from the New Mexico Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

eligibility categories, referrals were made for further diagnosis and treatment during EPSDT visits for 10.5 percent of those residing in waiver counties and 12.8 percent of those residing in non-waiver counties (Table 8). From 1990 to 1993, substantial increases in the percent of children referred during EPSDT visits occurred in both county groups, with a 6.7-percentage-point greater increase in waiver counties. In the waiver counties, almost one-quarter of all Medicaid children enrolled under AFDC and other non-SSI categories with EPSDT screening visits were referred for further diagnosis and treatment in 1993.

The multivariate probit analysis shows the same results, suggesting that the PCCM program increased the likelihood of referrals among children in 1993. However, significant increases in the probability of referrals were experienced by both PCCM participants and non-participants. Thus, EPSDT providers in waiver counties

had a single standard of care for children regardless of PCCM participation, and some program change—either the implementation of PCCM or some other initiative—made EPSDT providers in waiver counties more likely to refer children for further diagnosis and treatment compared with EPSDT providers in non-waiver counties.

New Mexico Disabled

Study Population Characteristics

Only 2.7 percent of the New Mexico Medicaid child population was enrolled under an SSI-related eligibility category in 1990 (Table 10). This percentage grew to 3.5 percent in 1993 as the disability standards for children applying for SSI payments were liberalized as a result of the *Sullivan v. Zebley* Supreme Court decision (493 U.S. 521, 1990) of February 20, 1990. Although they were a very small percent-

Table 11

Use of Selected Primary and Preventive Care Services Among AFDC and Other Non-SSI Medicaid Beneficiaries, New Mexico: 1990 and 1993

Service	Waiver Counties		Non-Waiver Counties		Difference in Differences	t-Statistic
	1990	1993	1990	1993		
Any Ambulatory Care Days (0-17 Years)	80.2	83.2	77.6	82.0	-1.4	-0.53
Any Emergency Room Visits (0-17 Years)	22.9	27.8	15.8	24.6	-3.9	-1.23
Any ACSC Hospital Stays (0-17 Years)	4.7	5.8	5.8	7.0	-0.1	-0.05
EPSDT Visits (2-60 Months)	50.3	68.6	26.7	39.5	5.5	0.78
EPSDT Referrals (0-17 Years)	36.3	45.3	26.6	43.1	-7.5	-1.31

NOTES: AFDC is Aid to Families with Dependent Children. SSI is Supplemental Security Income. ACSC is ambulatory care sensitive condition. EPSDT is Early and Periodic Screening, Diagnostic, and Treatment services.

SOURCE: Data from the New Mexico Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

age of child enrollees, SSI children accounted for almost 18 percent of Medicaid expenditures for children in 1990 and more than 21 percent in 1993.

The number of child SSI enrollees more than doubled from 1990 to 1993 in both county groups—from 637 to 1,426 in the waiver counties and from 548 to 1,190 in the non-waiver counties. Compared with non-disabled Medicaid children, SSI children were older and more likely to be male and enrolled in Medicaid for the full year. In the waiver counties, SSI children were less likely to be Hispanic than non-disabled Medicaid children, and in non-waiver counties, SSI children were less likely to be Native American than non-disabled Medicaid children.

SSI children in the waiver and non-waiver counties had similar distributions over age, gender, and Medicaid enrollment duration categories. However, proportionately fewer disabled Hispanic persons and more disabled Native Americans were in the waiver counties than in the non-waiver counties. During the study period, the distribution of SSI children became slightly more male, less white, and less likely to be enrolled for the full year.

Program Impact

SSI disabled children had different patterns of care compared with non-disabled

children. Nevertheless, with a few exceptions, the PCCM program impact was similar for these children. However, because of the small number of children enrolled under the SSI and related eligibility categories and the small program impacts, we found no statistically significant effects for this population.

Ambulatory Care Days

Approximately 80 percent of SSI child beneficiaries had at least 1 ambulatory care day during the study period compared with two-thirds to three-quarters of AFDC and other child beneficiaries in New Mexico (Table 11). In both analysis years, waiver-county SSI child beneficiaries were slightly more likely to have had any ambulatory care days than SSI children in non-waiver counties. Both county groups had increases in the percentages of SSI children with ambulatory care from 1990 to 1993 but no statistically significant differences in the changes over time were found in either the descriptive or multivariate analyses (Table 12).

Emergency Room Visits

In waiver counties, the percent of SSI children with ER visits was in the same approximate range as the percent for children enrolled in Medicaid under AFDC

Table 12

Standardized Probit Coefficients for the Differences in the Probability of Use of Selected Primary and Preventive Care Services Among SSI Medicaid Children in Waiver Counties, New Mexico: 1993

Status	Any Outpatient Days of Care ¹		Any Emergency Room Visits ^{1,2}		Any Hospital Stays for ACSCs ^{1,3}		Compliance with EPSDT Screening Visits ⁴		Any Referrals During EPSDT Visits ¹	
	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic	Coefficient	z-Statistic
All Children in Waiver Counties	-.040	-1.29	-.069	-1.76	-.004	-0.35	-.037	-0.33	-.068	-0.93
Delayed PCCM Participation	-.018	-0.45	-.085	-1.98	-.029	-2.08	-.075	-0.59	-.114	-1.40
Full PCCM Participation	-.008	-0.22	-.040	-0.98	-.014	-1.21	-.006	-0.04	-.074	-0.98
Disenrolled from PCCM	-.055	-1.24	-.051	-1.09	.012	0.69	-.053	-0.38	-.105	-1.23
Non-Participant in PCCM	-.079	-2.14	-.097	-2.41	.018	1.32	-.033	-0.28	-.011	-0.14
Number of Observations	3,789	—	3,082	—	3,658	—	674	—	1,403	—

¹ Observations for this equation were restricted to children 0-17 years of age.

² Observations for this equation were restricted to children with some ambulatory care days.

³ Inclusion of the county fixed effects resulted in the elimination of too many observations in these equations. Therefore, the county fixed effects were replaced with the following county-level variables: whether or not the county was rural, emergency rooms per square mile, and per capita income.

⁴ Observations for this equation were restricted to children 2-60 months of age.

NOTES: SSI is Supplemental Security Income. ACSC is ambulatory care sensitive condition. EPSDT is Early and Periodic Screening, Diagnostic, and Treatment services. PCCM is primary care case management.

SOURCE: Data from the New Mexico Medicaid Management Information System; analysis by Gavin, N.I., Farrelly, M.C., and Simpson, J.B., Research Triangle Institute, Research Triangle Park, NC, 1998.

and other eligibility categories (Table 11). In non-waiver counties, the percentage of SSI children with ER visits was substantially below the percentages for AFDC and other child beneficiaries and for SSI child beneficiaries in waiver counties. Both waiver and non-waiver counties had greater percentages of their Medicaid SSI child beneficiaries with ER visits in 1993 than in 1990, with a proportionately greater increase in the non-waiver counties. Thus, the PCCM program may have dampened the secular trend of increasing use of hospital ERs. However, the multivariate probit analysis revealed no statistically significant differences in the changes over time between the waiver and non-waiver counties (Table 12).

Hospital Stays for ACSCs

SSI children were more than twice as likely as other Medicaid children to have had a hospitalization with an ACSC diagnosis. In 1990, 4.7 percent of SSI children in waiver counties and 5.8 percent of SSI children in non-waiver counties had an ACSC hospital stay (Table 11). Similar to what we found for AFDC and other non-SSI Medicaid children in New Mexico, the incidence of ACSC hospitalizations among SSI children increased from 1990 to 1993. A slightly greater increase was found for SSI children in non-waiver counties, but the DD was not statistically significant in the multivariate probit analysis (Table 12).

EPSDT Screening Visits

In 1990 the percentage of recommended EPSDT visits completed among SSI children in waiver counties was higher than the percentage completed by AFDC and other non-SSI children in waiver counties and almost twice the percentage completed by SSI children in non-waiver counties.

The EPSDT completion rate increased substantially in both waiver and non-waiver counties, with a greater increase in waiver counties.

The DD among SSI children in the descriptive analysis was a 5.5-percentage-point increase. However, after controlling for various confounding factors in the multivariate analysis, the DD was a 3.7-percentage-point decrease. But neither the aggregate nor any of the four participation-level effects were statistically significant.

Referrals for Further Diagnosis and Treatment

Not surprisingly, SSI children were much more likely to have been referred for further diagnosis and treatment during EPSDT visits than children in the non-disabled eligibility groups. In 1990 SSI children in waiver counties were more likely than SSI children in non-waiver counties to have been referred for further diagnosis and treatment (36.3 percent versus 26.6 percent).

Similar to the trend we found for non-disabled Medicaid children in New Mexico, the percent of children with any referrals during EPSDT visits rose in both county groups from 1990 to 1993. However, in contrast to the non-disabled beneficiaries, the percent of children with referrals increased more in non-waiver counties. By 1993 SSI children in the two county groups were almost equally likely to have a referral during an EPSDT screening visit—45.3 percent of children in waiver counties and 43.1 percent of children in non-waiver counties. The results of the multivariate analysis agree with these findings, but they do not reach statistical significance.

CONCLUSION

Florida and New Mexico implemented similar mandatory PCCM plans under

their Medicaid programs in the early 1990s. The eligible populations, medical care systems, and geographic settings differed significantly between the two States. However, the program impact, estimated as the DD, was similar for Medicaid children in both States—a small but positive improvement in access to primary care and no meaningful effect on use of EPSDT screening visits among preschoolers.

In Florida, we observed the expected trends at both the aggregate and participant levels in the waiver counties in selected utilization measures reflecting access to primary care—a greater increase in the percent of children with any ambulatory care days and greater declines in the percentages of children with ER visits and ACSC hospitalizations. Thus, the evidence suggests that access to primary care improved in Florida with the implementation of the PCCM program.

In New Mexico, on the other hand, the percentages of children with all three types of care increased during the study period, but smaller increases were found among children in the waiver counties. Thus, for two of the three access measures, we obtained the expected signs in our DD estimates. We also found that referrals during EPSDT visits in New Mexico rose significantly for both non-disabled and disabled children in both waiver and non-waiver counties. The increase among Medicaid children enrolled under non-disabled eligibility categories was significantly greater than that for non-disabled beneficiaries in non-waiver counties. Therefore, the program may have had a small positive impact on access to primary and referral care.

In Florida the PCCM program had no apparent impact on the use of EPSDT screening services among young Medicaid children at the aggregate level. However, among children who participated in the

program for their full Medicaid enrollment period during the analysis year, we found a significant but very small positive effect. This small effect is surprising given the fact that EPSDT services were covered under the PCCM benefit package; PCPs, by participating in the program, essentially agreed to provide these services.

Similarly, in New Mexico, both program participants and non-participants in waiver and non-waiver counties made substantial gains in meeting national standards for health supervision visits in their EPSDT program, but we found no PCCM impact at the aggregate level. We did find that full-period PCCM participants enrolled under non-disabled eligibility categories had slightly greater increases in compliance with the recommended EPSDT screening visits. We were not able to verify a program impact on the EPSDT visit completion rate for disabled enrollees.

In conclusion, in the early 1990s, the PCCM programs in Florida and New Mexico had limited success in improving access to primary care, as measured by selected service-use measures. However, the great promise of the programs to substantially raise preventive care use among Medicaid children was not apparent in EPSDT screening visit rates either in Florida, the State in which these services were part of the PCCM benefit package, or in New Mexico, where EPSDT services were carved out of the PCCM benefit package. Thus, Medicaid managed care in the form of PCCM in and of itself is not sufficient; other complementary State activities are needed to increase the use of EPSDT screening services and thereby improve children's long-term health.

On a more positive note, with the implementation of mandatory PCCM programs, both Florida and New Mexico implemented some substantial Medicaid program

changes without seriously curbing children's access to or use of health care services, and in selected instances, made minor improvements.

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Reprint Requests: Norma I. Gavin, Research Triangle Institute, P.O. Box 12194, Research Triangle Park, NC 27709-2194. E-mail: Gavin@rti.org