

N A C H C F A X

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To: Chris Jennings/Devorah Adler

From: Dan Hawkins

Date: November 7, 1998

Number of pages including this cover sheet: 3

Message:

Attached is our response to Chris' request for our priority concerns and a proposed White House initiative. Please call if we can provide any additional information or answer any questions you may have.

Thanks.



National Association of
Community Health Centers, Inc.

MEMORANDUM

TO: Chris Jennings/Devorah Adler
Dan Mendelson/Jennifer

FROM: Dan Hawkins

DATE: November 7, 1998

RE: Proposal for FY 2000 Presidential Budget Initiative

Thanks to all of you for taking time from your obviously busy schedules to meet with Heather and me on Tuesday. I've thought a good deal over the past couple of days about how best to respond to your request for something that could be incorporated into the President's FY 2000 budget request, and that would be consistent with our key policy priorities for next year.

As I mentioned to you during the meeting, *our number one priority for 1999 will be to stop the imminent loss of Medicaid revenues among Health Centers*. The Medicaid FQHC payment system is scheduled to be phased out beginning next October, and as enacted in last year's BBA forces Health Centers to confront revenue losses that are impossible to avoid or overcome through greater efficiencies or cost-cutting. In FY 2000 alone, those revenue losses will exceed \$50 million, escalating to an estimated \$500 million in FY 2004 — an amount that exceeds one-half of the federal appropriated funding for the Health Centers program. Unless the payment system is fixed, Health Centers will be forced to terminate care for nearly 2 million hard working uninsured people over that period. As Chris will confirm from our discussions over the past 2 years, we are not wedded to the unfettered continuation of the old reasonable-cost payment system. However, we do believe that any phase-out of that system must of necessity be accompanied by a replacement or alternative which recognizes the Health Centers' unique patient and service mix — something which is entirely lacking in current law — and ensures that the Medicaid system pays its fair share for the care of Medicaid patients.

Our second priority for next year will be to seek another increase in federal funding for Health Centers, to allow them to reach out and serve more of the thousands of new uninsured people seeking their care across the country. We are grateful for the extra \$100 million provided by the Congress this year, which will allow Health Centers to serve an additional 400,000 uninsured persons in FY 1999. Yet, most Health Centers will *still* not have the resources they need to serve all the uninsured who seek their care locally, even though they have added more than 1 million uninsured to their patient rolls over the past 3 years. And while the new funding will help to establish new Health Centers in some communities that are currently unserved, it is nowhere near enough to help all communities in need (the new funding will support 50 new sites at most, whereas in 1997 nearly 250 applications were submitted and met all basic requirements for funding).

- effects of commercial
mgd care —
level of uncompensated
care below 4%

- continued -

uninsured being
seen by health centers
growing

In thinking about how these items might fit together thematically, I was struck by how much sense it would make to propose a Primary Care Access Initiative, one which calls for some key steps to preserve and strengthen access to primary health care for the growing numbers of uninsured and under-insured Americans. Such an initiative would be especially important now, as the burgeoning uninsured population confronts a seriously reduced level of uncompensated care (thanks to the cost pressures of commercial managed care), and during a period when (unfortunately) the Congress is less likely to undertake further incremental coverage expansions. The initiative could consist of the above two items:

- **The Medicaid payment correction for Health Centers**, to ensure that any new discretionary Health Center funding can be dedicated to expanding care for additional uninsured persons and for other intended purposes, and will not have to be used to offset lost Medicaid revenues due to the payment phase-out. *reasonable cost*
- **A long-term investment in the Health Centers program**, to support the provision of comprehensive primary health care to more uninsured persons, both at current and — if you wish — at new service sites, as well as for other purposes you decide (for example, \$250 million would support care for 1 million more uninsured persons; \$125 million would serve 500,000 people). This could be proposed as the first of several such investments with the goal of establishing primary care access points in most or all underserved communities over a multi-year period, similar to the Administration's recent successful Head Start expansion efforts). This investment could be linked to other Administration priorities, such as the racial disparities initiative or early literacy. It would also give you more locations where aggressive Medicaid and CHIP enrollment would be done (while in Indiana this week, I learned that Health Centers have provided *more than one-third* of all CHIP enrollment to date, even though they make up less than 5 percent of all CHIP enrollment sites).

I would also recommend that the initiative should include an investment in the National Health Service Corps program, to ensure the availability of primary health care practitioners for many of the new Health Center access points (\$50 million would support at least 500 additional practitioners). This step is particularly important for rural underserved communities, where many current Health Centers have experienced severe difficulties in attempting to recruit physicians and other providers. It would also help to reduce the need in underserved areas for foreign-born physicians under the J-1 visa waiver program, an issue of great concern to you and to us.

I hope that this responds appropriately to your request. I and my staff would be pleased to assist you in any way we can on these matters. Please feel free to call me at (202) 659-8563.

Thanks again for your interest and concern for Health Centers and for the people and communities they serve.

cc: Barbara Woolley

University of VT study

CFHSPR
NYCA

WA

• UHV studies
from MD M/C agency
Barbra Steinnachs
Don Steinnachs
95-97

national

\$250
\$300
primary care
4 visits a
year

KEY STUDIES OF HEALTH CENTER EFFECTIVENESS

Several recent studies have found that Medicaid patients who regularly use health centers provide care of equal or greater quality and cost significantly less than those who use other providers, such as HMOs, hospital outpatient units or private physicians. For instance:

- In Washington state in 1992, health center patients were found to be 36% less expensive for all services than patients of other primary care providers and used 31% fewer emergency room services¹;
- In California in 1993, health center patients were 33% less expensive overall (controlling for maternity services), and had 27% less total hospital costs²;
- In Maryland in 1993, health center patients had lowest total payments; lowest ambulatory visit cost; lowest incidence of inpatient days and lowest inpatient day cost; health center patients were one-third as likely as hospital outpatient unit patients to be admitted on an inpatient basis and were half as likely to have unstable chronic medical diagnoses as patients of other providers³;
- In New York in 1994, health center patients were 22-30% less expensive overall, and had 41% lower total inpatient costs; diabetics and asthmatics who were regular health center users had 62% and 44% lower inpatient costs, respectively⁴.
- In Maryland in 1994 and 1995, two separate system-wide studies of thousands of Medicaid patient medical records in Maryland found that:
 - health centers consistently scored at or near the highest in 21 separate measures of quality assessment, even though their costs of care were among the lowest of the various provider types reviewed ⁵; and
 - health centers scored highest among all providers for the proportion of their pediatric patients who had received preventive services, including immunizations⁶.

These findings are consistent with those from dozens of previous studies on the cost-effectiveness and quality of care provided through the health center model, and in particular addressing the health centers' demonstrated and historic savings to state Medicaid programs. Taken together, these studies have found that:

- Use of health centers led to lower utilization of more costly emergency rooms, ranging from 13 percent to 38 percent in the case of pediatric emergency room use, improved health outcomes and lower incidence of chronic disease and disability.⁷
- Health centers have reduced inpatient admission rates for their patients by anywhere from 22 percent to 67 percent, reduced the number of patients admitted per year and the length of stay among those who were admitted.⁸

1. Braddock, Dennis, et al, Using Medicaid Fee-For-Service Data to Develop Health Center Policy, Washington Association of Community Health Centers and Group Health Cooperative of Puget Sound (1994).
2. Health Services Utilization and Costs to Medicaid of AFDC Recipients in California Served and Not Served by Community Health Centers, Center for Health Policy Studies/SysteMetrics (1993).
3. Stuart, Mary E., and Steinwachs, Donald M., (Johns Hopkins Univ. School of Public Health and Hygiene), "Patient-Mix Differences Among Ambulatory Providers and Their Effects on Utilization and Payments for Maryland Medicaid Users," Medical Care 34,12 (December 1993): 1119-1137.
4. Utilization and Costs to Medicaid of AFDC Recipients in New York Served and Not Served by Community Health Centers, Center for Health Policy Studies (1994).
5. Starfield, Barbara, et al, "Costs vs. Quality in Different Types of Primary Care Settings," Journal of the American Medical Association 272,24 (December 28, 1994): 1903-1908.
6. Stuart, Mary e., et al, "Improving Medicaid Pediatric Care," Journal of Public Health Management Practice 1(2) (Spring, 1995): 31-38.
7. See, e.g., De Prez, Ronald, et al, "The Substitutability of Outpatient Primary Care in Rural Community Health Centers for Inpatient Hospital Care," Health Services Research 22,2 (June 1987): 207-233; Fleming, G. and Andersen, R., "The Municipal Health Services Program: Improving Access to Primary Care without Increasing Expenditures," Medical Care 24,7 (July 1986): 565-579; Freeman, H.E., Kiecolt, K. J., and Allen, H., "Community Health Centers: An Initiative of Enduring Utility", Milbank Memorial Fund Quarterly 60,2 (Spring 1982): 245-267; Gold, M. and Rosenburg, R., "Use of Emergency Room Services by the Population of a Neighborhood Health Center", Health Services Reports 89,1 (January-February 1974): 65-70; Hockheiser, L., Woodward, K., and Charney, E., "Effect of the Neighborhood Health Center on the use of Pediatric Emergency Departments in Rochester, New York," 285 New England Journal of Medicine 148 (July 15, 1971): 148-152; Moore, G., Bonnano, R., and Bernstein, R., "Effect of a Neighborhood Health Center on Emergency Room Use", Medical Care 10,3 (May-June 1972): 240-247; and Sussman, E., et al, "Can Primary Care Deliver?", Journal of Ambulatory Care Management 2,3 (August 1979): 29-39.
8. "Final Report for Community Health Center Cost Effectiveness Evaluation," JRB Associates for U.S. Department of Health and Human Services, Contract No. 100-78-0138 (1981). See also Davis, Karen and Schoen, Cathy, Health and the War on Poverty: A Ten-Year Appraisal (Brookings Institution, Washington, D.C., 1977); Fleming, G., and Andersen, R., "The Municipal Health Services Program: Improving Access to Primary Care without Increasing Expenditures," Medical Care 24, No. 7 (1986): 565-579; and Okada, L., And Wan, T., "Impact of Community Health Centers and Medicaid on the Use of Health Services," Public Health Reports 95, No.4 (1980): 520-534.

SUMMARY OF CHC COST-EFFECTIVENESS STUDIES

Hochheiser found that pediatric patients of **4 health centers in Rochester, NY**, had 38% lower hospitalization rates and fewer days than non-health-center-patients living in the same area (New England Journal of Medicine, 1971)

Sparer and Anderson found that, for **6 health centers** studied, the cost of care and cost per registrant was comparable to that for prepaid group practices (New England Journal of Medicine, 1972)

Zwick found that the annual hospital use rate for patients of a **CHC in Chicago** was reduced from 1000 days/year to 750 days/year over 3 years (Milbank Memorial Fund Quarterly, 1972)

Davis and Schoen found that **nationally**:

- the cost of care at health centers in 1975 was \$204, compared with \$240 for other providers (principally private physicians),
- the cost of hospital care was \$65 lower for health center patients than for those served by other providers,
- centers had reduced hospital admission rates by anywhere from 22% to 67%, as well as the number of patients admitted and average lengths of stay, compared with patients of other providers (Health and the War on Poverty, 1977)

Okada and Wan found that patients of **at least 11 CHCs in 5 cities** (Boston, Charleston, Atlanta, Kansas City and Palo Alto) were hospitalized 34 % less often than users of private physicians or hospital clinics (Public Health Reports, 1980)

Freeman compared hospitalization rates and emergency room use for patients of **health centers in 5 cities** at two points in time (1969 and 1975), and found that hospitalization rates declined 44% and ER visits 37% over the period (Milbank Memorial Fund Quarterly, 1982)

JRB Associates found that Medicaid patients of **more than 20 health centers in 4 states** (Colorado, Kentucky, Michigan and Minnesota) had 30% to 65% lower hospitalization rates, 33% fewer annual hospital days per patient, and 12% to 48% lower total Medicaid costs than a similar group of non-health-center Medicaid patients (Final Report on Health Center Cost Effectiveness, HHS, 1982)

Zuvekas found that the per capita cost of care at **all U.S. health centers** in 1988 was \$183, compared with \$238 for all Americans below 200% of poverty, using the Lewin-VHI Health Benefits Simulation Model (Journal of Ambulatory Care Management, 1990).

Starfield found that Medicaid patients of **10 health centers in Maryland** had the lowest total costs, lowest cost per ambulatory visit, lowest incidence of hospital inpatient days and lowest inpatient care costs, when compared with Medicaid patients of 106 private physicians and 19 hospital outpatient departments (Journal of the American Medical Association, 1994).

The Center for Health Policy Studies found that **almost 23,000 Medicaid patients of 10 health centers** in California and New York were 22 % to 33 % less expensive and had 27 % to 63 % lower hospital care costs, than a stratified sample of more than 50,000 Medicaid recipients living in the same communities who use other providers (Health Services Utilization and Costs to Medicaid of AFCD Recipients in New York and California Served and Not Served by Selected Community Health Centers, 1994)

Improving Medicaid Pediatric Care

Mary E. Stuart, Donald Steinwachs, Barbara Starfield, Suezanne Orr,
and Ann Kerns

This article uses Medicaid claims data to examine the adequacy of well-child care provided by different ambulatory care providers for selected children enrolled in Maryland Medicaid.

Considerable provider variation was observed. The majority of the nearly one-quarter of the children with no well-child visits during the year appeared to have had no regular primary care source. Results contributed to the development of a managed care program designed to increase care accessibility and continuity and improve provider practices. Advantages and disadvantages of using claims data to investigate this public health issue are discussed.

Key words: *claims data, provider variation, well-child visits*

THE ADEQUACY OF preventive care under the Medicaid program has been an ongoing concern since its inception. Implementation of Medicaid's Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) program in 1989 was a landmark investment in improving preventive care for poor children. Almost every year since 1981 has seen significant changes in federal Medicaid law, either in the expansion of benefits and/or eligibility.¹

Data from the 1982 and 1988 National Health Interview Surveys indicate that Medicaid facilitates the receipt of preventive care by young, low-income children. Low-income children who are not Medicaid recipients receive less preventive care than their counterparts with Medicaid.² Disparities between Medicaid recipients and nonpoor children in the use of preventive care are less clear. In an analysis of

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1988 National Health Interview Survey data of children under 18 years of age, those with Medicaid compared to those living above the poverty line were less likely to receive routine care in physicians' offices and more likely to use different care sources for routine and sick visits. Nevertheless, they compared favorably with all children living above the poverty line in making timely visits for routine care.¹ In contrast, in an analysis of 1987 National Medical Expenditure Survey data for children under five years of age, Medicaid recipients were found to be less likely than privately insured children to have had a well-child visit over the period of a year (56 percent versus 65 percent). Medicaid recipients were also less likely to have had a well-child visit in the previous year than children from middle/high-income families (56 percent versus 67 percent).²

Information on sources of practice variation in preventive care would certainly be useful to policymakers; however, research in this area has largely focused on acute care procedures or on differences in the delivery of care by geographic areas.³⁻⁵ Individual states can remedy the absence of information on variation in preventive care by using routinely collected claims data from their own Medicaid program. Maryland uses Medicaid data to examine a variety of issues related to the adequacy and outcomes of preventive care. This article examines the adequacy of well-child care for young children in Maryland's Medicaid program, explores practice variation both among and within provider types, and describes steps being taken in Maryland to improve preventive care for the Medicaid population.

The data source for this study was the Maryland Medicaid Management Information System, which contains paid claims records for all services provided to Medicaid enrollees. Within the system, an eligibility file provides for each Medicaid enrollee the birth data, address, and enrollment history. A provider file contains specialty and practice type data on each provider. A payment history file provides for each paid claim the patient's Medicaid number, age, race, sex, and International Classification of Diseases (ICD-9) diagnostic code or codes; data on the provider; rendered services by code; and the payment amount. Since 1985, Maryland Medicaid has been using pertinent data from these three files to create annual utilization and payment summaries for each Medicaid enrollee. Because Maryland Medicaid provides comprehensive coverage for its recipients, these files, with a few exceptions noted later, yield a relatively complete account of

utilization and expenditures for continuously enrolled persons.

Data for this study were derived from the enrollee-based analysis file for fiscal year 1987 (July 1, 1986 to June 30, 1987). At some time during that year, 11,137 children who were between 12 and 33 months old and receiving Aid to Families with Dependent Children (AFDC) were enrolled in Medicaid. The study was limited to children who were continuously enrolled during fiscal year (FY) 1987 so as to obtain an account of their utilization of well-child services for the entire year.

Specifically, in constructing the study population the study began with the 8,980 continuously enrolled AFDC children who were aged 12 to 24 months old at the end of FY 1987 (Table 1). (This was not a subpopulation of the 11,137 children noted earlier since the age criteria used to define the two populations differed.) Then, the 1,453 children who were health maintenance organization (HMO) enrollees were excluded because at that time Maryland Medicaid did not receive utilization data from these organizations. Another 95 children were excluded due to insufficient data. The remaining 7,247 were categorized as users or nonusers of ambulatory care. Users were then linked to a majority care source on the basis of the criteria described earlier.

A major methodological issue in this study was the need to identify a care source for each child. To look at variation in the delivery of preventive care among and within care source types, claims data were used to identify the care source with which each Medicaid recipient was predominantly associated. An enrollee could only be linked to a provider if that enrollee had made at least one ambulatory visit during the study period. Then for each ambulatory care user, a majority care source, operationally defined as the provider who received more than 50 percent of that user's visits during FY 1987, was identified. Provider types included hospital outpatient departments, hospital emergency rooms, office-based physician practices, federally qualified health centers, and children and youth centers. Users for whom no single provider received more than 50 percent of their visits were classified as users with no majority care source. In determining the majority care source for users of office-based physicians practicing as a group, the calculations were based on visits to the group, rather than to the specific physician within the group. This was also true for visits to federally qualified health centers and to children and youth centers. Using these criteria, 5,495 children were cat-

Table 1

Study population and number of ambulatory care users by majority care source*, Maryland Medicaid, AFDC†, fiscal year 1987

Individuals	Number
All children continuously enrolled in FY 1987, aged 11-24 months at the end of FY 1987	8,980
Excluded	
HMO enrollee‡	1,638
Insufficient data§	95
Nonusers and users of ambulatory services	7,247
Nonusers of any ambulatory services	537
Users of ambulatory services	
Users of local health department well-child services only	195
Users by majority care source*	8,485
Office-based practice	2,782
Outpatient department	519
Emergency room users	711
Federally qualified health center	430
Children and youth center	528
No majority care source	1,427

* Ambulatory care users were assigned to the care source to which they had made more than 50 percent of their ambulatory visits in FY 1987.

† AFDC is Aid to Families with Dependent Children.

‡ HMO enrollees were excluded from the study population because Maryland Medicaid does not receive utilization data from HMOs.

§ These individuals were excluded because they were users of the outpatient departments or of the emergency rooms of two hospitals, which failed to distinguish well-child visits from other types of visits.

Source: State of Maryland Department of Health and Mental Hygiene; data from the Maryland Medicaid Management System; data developed by the Policy and Health Statistics Administration.

egorized by majority care source. Another 195 children, although classified as users, could not be assigned to any of the care sources noted earlier. Their only ambulatory care utilization consisted of well-child visits to local health departments. The remaining 537 had made no ambulatory care visits during FY 1987 and were classified as nonusers (Table 1).

Each child's age was specified by age at the end of the study period, that is, by the end of FY 1987. Children who were born during the first month of FY 1987 were included in the study as were all those born during the 12-month period predating FY 1987. Thus, the youngest children were 11 months old at the end of the study year and the oldest, 24 months

old. To differentiate between care provided in the first and second years of life, the children were divided into two groups. Children who were 11 to 12 months old at the end of the study period were categorized as under one year old, and those who were 13 to 24 months old at the end of the study period as over one year old.

Two measures of preventive care were initially selected: well-child visits and immunizations. Ultimately, only one of these measures, well-child visits, proved to be meaningful. Immunizations could not be used because data were incomplete. In Maryland, local health departments, which receive vaccines free, are allowed to bill Medicaid for well-child clinic visits, but not for immunizations. Consequently, if a child was immunized during a well-child visit to a local health department, the visit but not the immunization was represented in the claims data.

Defining well-child visits with Medicaid claims data required the capture of a variety of codes because hospitals, office-based practices, and clinics billed the program in different ways. In this study, well-child visits were defined as any visits billed to Medicaid under the current procedural terminology (CPT) codes for well-child screens, the Medicaid billing codes for EPSDT providers, and the ICD-9 Clinical Modification codes in the "V" series (V20, V200, V201, V202). Because hospital outpatient departments in Maryland did not bill Medicaid using CPT codes, the V codes were the major source of information available on Medicaid claims to indicate that a hospital outpatient department had provided preventive care. Failure to include the V-codes would have reduced the estimate of preventive visits by 31 percent. Users of two hospitals were excluded from the study population because these facilities failed to use V-codes to distinguish well-child visits from other types of visits when billing Medicaid. Those users represent the 95 cases excluded for insufficient data as noted on Table 1.

Provider types included hospital outpatient departments, hospital emergency rooms, office-based physician practices, federally qualified health centers, and children and youth centers.

V-codes also were useful in capturing some instances of preventive care provided by office-based practices. These practices sometimes billed Medicaid with the standard CPT code for acute care in conjunction with an ICD-9 V-code to indicate that the visit was for preventive care. There was concern that local health departments may have provided well-child visits without billing Medicaid. After conducting sensitivity tests, as well as discussing this possibility with local health departments, it was concluded that the occurrence of such an event was infrequent.

The measure of well-child care selected for this study was the occurrence of one or more well-child visits during the course of FY 1987. This is a minimal standard, in light of the recommendations of the American Academy of Pediatrics, calling for six visits in the first 12 months of life and two visits between the ages of 12 and 24 months.⁸ The minimal one or more well-child visits standard was selected because information for examining this standard was available in the annual analysis files and would provide a simple monitoring strategy that the Medicaid program could replicate with limited resources on an ongoing basis.

Initially, consideration was given to the possibility of developing a specialized analysis file that would allow determination of how closely a recommended

schedule for well-child care was being followed. This approach was rejected for several reasons. As discussed earlier, the variety of codes used by different provider types and the incompleteness of immunization data made it impossible to determine the exact content of visits. In addition, despite widespread agreement regarding the general value of well-child care, there is no consensus on the optimum number of well-child visits, nor is there much information available on the cost-effectiveness of this type of care. In light of these considerations, the added value to Medicaid of increasing the specificity of data on well-child visits would not sufficiently offset the time and cost required to create a specialized file. In essence, the major objective was to develop indicators of well-child care that would be simple and inexpensive to replicate annually.

Summary of Key Findings

Of the 7,247 AFDC continuously enrolled children, 24 months old or younger who were not in HMOs (Table 1), eight percent had made no ambulatory visits for either sick- or well-child care (Table 2). Twenty-four percent had made no well-child visits during FY 1987 (Table 3). Those who were 12 months old or younger were significantly more likely than those between 13 and 24 months old to have

Table 2

Percentage of enrolled children* by the occurrence of at least one ambulatory visit† by age‡, Maryland Medicaid, AFDC, fiscal year 1987

Ambulatory visit‡ in 1987	Age‡					
	Total ≤ 24 months		Under 1 year		Over 1 year	
	Number	Percentage	Number	Percentage	Number	Percentage
No	557	7.7	48	4.5	512	8.2
Yes	6,690	92.3	958	95.5	5,734	91.8
Total	7,247	100.0	1,007	100.0	6,246	100.0
						$\chi^2 = 13.7$
						$p < 0.001$

* Children who were continuously enrolled in Medicaid during FY 1987, were aged 12-24 months at the end of FY 1987, and were not HMO enrollees.

† Children were counted as having an ambulatory visit if they visited an office-based practice, emergency room, outpatient department, or clinic. Included in these calculations were the 195 children who made only a well-child visit to a local health department.

‡ Children in the "Under 1 Year" and "Over 1 Year" categories were, respectively, 11-12 months and 13-24 months old at the end of FY 1987.

§ AFDC is Aid to Families with Dependent Children.

Source: State of Maryland Department of Health and Mental Hygiene; Data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

Table 3

Percentage of enrolled children* by the occurrence of at least one well-child visit† by age‡, Maryland Medicaid, AFDC, fiscal year 1987

Well-child visit in FY 1987	Age§					
	Total ≤ 24 months		Under 1 year		Over 1 year	
	Number	Percentage	Number	Percentage	Number	Percentage
No	1,714	22.7	166	18.6	1,548	24.3
Yes	5,535	78.3	835	83.4	4,698	75.2
Total	7,247	100.0	1,001	100.0	6,246	100.0
						$\chi^2 = 32.1$
						$p < 0.001$

*Children who were continuously enrolled in Medicaid during FY 1987, were aged 11-24 months at the end of FY 1987, and were not HMO enrollees.

†Well-child visits were those billed under CPT codes for well-child screens, EPSDT codes, and ICD-9 codes in the "V" series (V20, V200-V202). These calculations also included those children whose only ambulatory care was a well-child visit to a local health department.

‡Children in the "Under 1 Year" and "Over 1 Year" categories were, respectively, 11-12 months and 13-24 months old at the end of FY 1987.

§AFDC is Aid to Families with Dependent Children.

Sources: State of Maryland Department of Health and Mental Hygiene; Data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

made an ambulatory visit and to have received well-child care in that year ($p < 0.001$). However, even in the first year of life, five percent had made no ambulatory visit, and 17 percent had made no well-child visit.

Among the 6,495 ambulatory users who were assigned to a majority care source (Table 1), the majority care source was an office-based practice for 43 percent, an outpatient department for 10 percent, an emergency room for 11 percent, a federally qualified health center for 7 percent, a children and youth center for 8 percent. Using the decision criteria described earlier, the remaining 22 percent were classified as users with no majority care source.

For these 6,495 users, the percentage of users with at least one well-child visit was compared for users with different majority care sources (Table 4). Differences between care-source types were significant at $p < 0.001$. Percentages ranged from a high of 92 percent for users whose majority care source was a federally qualified health center to a low of 57 percent for users with a hospital emergency room as their majority care source. Office-based practices, which were the majority care source for the largest number of users (2,782), had a relatively high percentage of users with at least one well-child visit (89 percent).

Variability within the category of office-based practices was then examined. First, practices that were the major care source for 20 or more patients were selected. These 31 practices, representing seven percent of the total number of office-based practices, were the majority care source for 1,159 children. Considerable variation was found among these practices with respect to the number of their users who had well-child visits. The percentage of their users with at least one well-child visit ranged from 50 percent to 100 percent. For five of these practices, 100 percent of their users had at least one well-child visit, and for 23, between 80 percent and 99 percent of their users had one or more well-child visits. However, for the remaining three practices, less than 80 percent of their users had one or more well-child visits. Specific percentages for these three practices were 71, 57, and 50.

Examination of variability within hospitals was made by comparing their outpatient departments with their emergency rooms (Table 5). In this comparison, a hospital was included if either its emergency room or its outpatient department was the majority care source for 20 or more users. These ten hospitals accounted for 82 percent of all users whose majority care source was either a hospital outpatient

Table 4

Ambulatory care users* with at least one well-child visit† by majority care source of user‡, Maryland Medicaid, AFDC‡, fiscal year 1987

Majority care source of user†	Users* with at least one well-child visit†	
	Number	Percentage
Office-based practice	2,473	88.9
Outpatient department	548	88.3
Emergency room	408	57.4
Federally qualified health center	396	92.1
Children and youth center	359	73.9
No majority care source	1,114	70.1
Total with at least one well-child visit	5,338	82.2

$\chi^2 = 461.0$
 $p < 0.001$

*Individuals who were continuously enrolled in Medicaid for FY 1987, were aged 1-64 months at the end of FY 1987, and had at least one ambulatory visit. The 195 children whose only ambulatory visit was to a local health department were excluded from these calculations.

†Well-child visits were those billed under CPT codes for well-child screens, EPSDT codes, and ICD-9 codes in "V" series (V20, V200-202).

‡Ambulatory care users were assigned to the care source to which they had made more than 50 percent of their ambulatory visits in FY 1987.

§AFDC is Aid to Families with Dependent Children. Source: State of Maryland Department of Health and Mental Hygiene; Data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

department or an emergency room. Among these hospitals, the percentage of users with at least one well-child visit ranged from 75 percent to 98 percent for outpatient department users, and from 21 percent to 90 percent for emergency room users. For each hospital, the percentage of users with at least one well-child visit was consistently lower for emergency room users than for outpatient department users.

Finally, the group of children who appeared to have had no regular source of primary care, that is, those who received the majority of their care from an emergency room, those who were classified as having no majority care source, and those who had made no ambulatory visits of any kind during the study year were examined. It was found that these children, as a group, accounted for 69 percent of the total number of 1,714 children who had received no well-

child care during FY 1987, even though they comprised only 37 percent of the 7,247 children included in the study. The 69 percent included 303 emergency room users, 313 users with no majority care source, and 557 children who had made no ambulatory visits of any kind during the year.

Discussion

The finding that nearly one-quarter of Maryland's Medicaid children aged 24 months or younger had no well-child visit is cause for concern. The possibility that well-child care was underestimated because it was provided during a sick-child visit, because the visit was improperly coded, or because some physicians may have provided well-child care without billing the Medicaid program must be considered. Nevertheless, the results are consistent with previously reported findings regarding the inadequacy of preventive care for low-income children.⁴

Both the methodological advantages and disadvantages associated with the use of claims data in health care research have been discussed in the literature.¹⁰⁻¹³ This article has tried to describe as clearly as possible the limitations and problems encountered in conducting this investigation. What remains to be mentioned is that the research also benefited from some of the advantages connected with the use of claims data. For example, claims data are not subject to respondent recall bias, nor are they dependent on provider or patient willingness to be a part of the study population.¹⁴ Claims data also provide a large well-defined study population, and, as noted earlier, when the population is restricted to continuously enrolled individuals, they furnish a relatively comprehensive view of utilization and cost patterns over a defined period of time. Finally, they permit investigators to link information on specific persons across data elements.

Putting Claims Data Research to Work

Results obtained by analyzing Medicaid claims data, both in this study as well as in several related studies, contributed to the development of the Maryland Access to Care (M²C) program. This program, implemented in December 1991, was designed to improve the continuity and accessibility of care and to reduce inappropriate emergency room use for the Medicaid population. Findings instrumental in determining the design of the program were: (1) that 69 percent of the children who had no well-child visits

Table 3

Percentage of users* with at least one well-child visit† by hospital facilities serving 20 or more users, Maryland Medicaid, AFDC‡, fiscal year 1987

Specific hospital	Outpatient department users*		Emergency room users*	
	Total no. of users	Users with at least one well-child visit (%)	Total no. of users	Users with at least one well-child visit (%)
A	204	95.6	52	46.2
B	37	91.9	178	20.5
C	155	92.2	21	76.2
D	LN.‡	LN.‡	125	81.7
E	54	75.3	44	47.7
F	34	100.0	24	75.0
G	34	91.2	LN.‡	LN.‡
H	LN.‡	LN.‡	38	89.5
I	24	75.0	14	42.9
J	LN.‡	LN.‡	30	80.0

* Individuals who were continuously enrolled in Medicaid for FY 1987, were aged 12-24 months at the end of FY 1987, had at least one ambulatory visit in FY 1987, and made more than 50 percent of their ambulatory visits to either an outpatient department or an emergency room.

† Well-child visits were those billed under CPT codes for well-child screens, EPSDT codes, and ICD-9 codes in the "V" series (V20, V200-202).

‡ AFDC is Aid to Families with Dependent Children.

§ LN. = Insufficient number.

Source: State of Maryland Department of Health and Mental Hygiene; Data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

appeared to have had no regular source of care, (2) that a high proportion of users of federally qualified health centers had well-child visits, (3) that there was an overall deficit in well-child care, and (4) that there was marked variation in the delivery of preventive care both among and within care source categories.

In reference to the first finding, MAC program design assures recipient access to a regular source of care. Under the program, most Medicaid recipients are required to select a primary care provider, who is then responsible for providing or preauthorizing all care, except for true emergencies. The primary care provider is required to maintain daily 24-hour availability either through a calling arrangement or

through back-up coverage. Eligible recipients are sent a brochure explaining the program and may sign up with a provider either through the mail, in person, or by phone. Recipients who do not choose a provider within a reasonable amount of time are assigned to one in their locality. It is anticipated that with access to a regular source of care for all recipients, there will be an overall improvement in the continuity of care, less reliance on emergency rooms for nonemergency care, and an increase in well-child visits.

As part of the endeavor to improve the accessibility of care, a special effort was made to recruit additional primary care providers to the program. Significant increases in fee-for-service reimbursements for primary care were instituted. Less well-served areas in the state were also identified and this problem was remedied, in part, through the development of additional nonprofit health centers.

The second finding, which concerned the strong performance of the federally qualified health centers in providing well-child care and other preventive services, was the guide in the development of

The finding that nearly one-quarter of Maryland's Medicaid children aged 24 months or younger had no well-child visit is cause for concern.

needed centers. In February 1991, Maryland established a state version of these centers. Under this legislation, five new centers were established and ten previously existing nonprofit centers added services that enabled them to become Maryland-qualified health centers.

The program addressed the third finding, the overall deficit in well-child care, in several ways. For example, MAC primary care providers who agree to care for children must either provide EPSDT services directly or furnish written documentation that other arrangements have been made for delivering these services. To further encourage well-child care, fees paid for EPSDT visits are higher than those paid for regular visits. In addition, Medicaid nurses conduct chart reviews and counsel providers regarding areas where well-child care can be improved.

Lastly, the program plans to address practice variation problems by supplying providers with comparative feedback information. MAC providers will receive periodic provider variation reports comparing rates of well-child care for children in their practices with that of children cared for in other practices. In addition, Medicaid nurses will use the practice variation reports to further help identify providers in need of counseling with respect to the provision of preventive services.

Another facet of the program design recognizes that the provision of preventive care for a child is not only the responsibility of the child's medical provider but also of the child's parents or caretakers. When claims data indicate a child has not received appropriate preventive care, a letter will be sent to the child's parents or caretakers reminding them to contact their child's physician so that the needed care can be delivered. In accordance with this emphasis on shared responsibility, the Maryland Department of Human Resources recently instituted a new policy whereby AFDC recipients who fail to provide their preschool children with preventive care will have their AFDC benefits decreased.

The MAC program was implemented in December 1991. An independent evaluation, funded by the Health Care Financing Administration, is currently underway.

■ ■ ■

This case study illustrates how administratively derived data, even with simple indicators, can yield policy-relevant information. In this particular case, it provided information relevant to the development of policies expected to improve preventive care for

children. It contributed to Maryland's policy decision to link each recipient with a primary care provider through the MAC program. The use of claims data to profile practice variation in preventive care and to provide feedback to physicians and parents should improve the health of the children under their care. Finally, claims data will play a central role in program evaluation, and evaluation results, in turn, will guide future policy development with respect to improving pediatric care in Maryland.

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EXECUTIVE SUMMARY

**HEALTH SERVICES UTILIZATION AND COSTS TO MEDICAID
OF AFDC RECIPIENTS IN CALIFORNIA SERVED
AND NOT SERVED BY COMMUNITY HEALTH CENTERS**

Contract 240-90-0071

February 24, 1993

Submitted to:
Bureau of Primary Health Care
Health Resources and Services Administration
Department of Health and Human Services

Prepared by:
Center for Health Policy Studies
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EXECUTIVE SUMMARY

A study of 1989 health care utilization and payments by the California Medicaid program (Medi-Cal) for services provided to Medicaid enrolled persons residing in four geographic areas was conducted. The hypothesis that those recipients whose customary source of primary care was a federally funded Community Health Center (CHC) would experience different patterns of inpatient hospitalization, and would incur lower costs to Medicaid than would those who did not use a CHC was tested. The study hypothesis was confirmed, with statistically significant reductions observed for hospital admissions, hospital inpatient days, prescription drugs, other covered services, and total payments by Medicaid for regular users of CHCs in comparison with non-users. Cost savings to Medicaid in 1989 for regular users of CHCs averaged 33% of the expected costs per case or per recipient year, when maternity cases were excluded. Cost per maternity case averaged 8% less among regular users of CHCs, but CHCs attract disproportionate numbers of pregnant women.

Four CHCs were selected for study, including two urban and two rural CHCs. The CHC user populations for the study were restricted to Medi-Cal recipients who qualified for entitlement under the Aid to Families with Dependent Children (AFDC) category and who resided in ZIP code areas identified as within the service areas of the CHCs. The comparison groups consisted of AFDC recipients residing in the same areas who did not utilize the CHCs during 1989. All Medi-Cal paid claims for the user and non-user groups, together with the enrollment records for each recipient, served as the data source for utilization, payments, and demographic characteristics of recipients.

Selection of CHCs for study was restricted to those that met the following criteria:

- In compliance with federal funding guidelines, as indicated by receipt of a score of "A" or "B" on their grant application review during 1989 (about 75% of all CHC grant recipients received an A or B score in 1989),
- Saw a large number of Medi-Cal recipients during 1989, as indicated by Medicaid reimbursements of at least \$250,000 during 1989 and,
- Agreed to voluntarily participate in the study.

AFDC recipients included in the study had to have at least 6 months of eligibility during the calendar year (except for newborns who only had to be eligible at least half of the time from date of birth until the end of the study year), not be institutionalized more than half of their period of eligibility, not have another third party payment source, and not have participated in a Medicaid capitation program during the study year. Medicaid eligibles without any outpatient paid claims were not included in the study since it was not possible to identify their customary source of care.

The study was performed using the Medi-Cal paid claims and eligibility files in the "Tape-to-Tape" Medicaid data system maintained by the Health Care Financing Administration (HCFA). Recipients with any use of the CHC during 1989 were defined as

users, but only those with 50% or more of their physician visits provided by the CHC were classified as "regular users". Recipients with no visits to the CHC were classified as "non-users". Recipients with at least one visit to the CHC, but with less than 50% of their physician visits provided by the CHC were classified as "occasional users". The non-users and occasional users received most of their physician services from hospital outpatient departments (OPDs) or emergency rooms (ERs), or from private practice physicians.

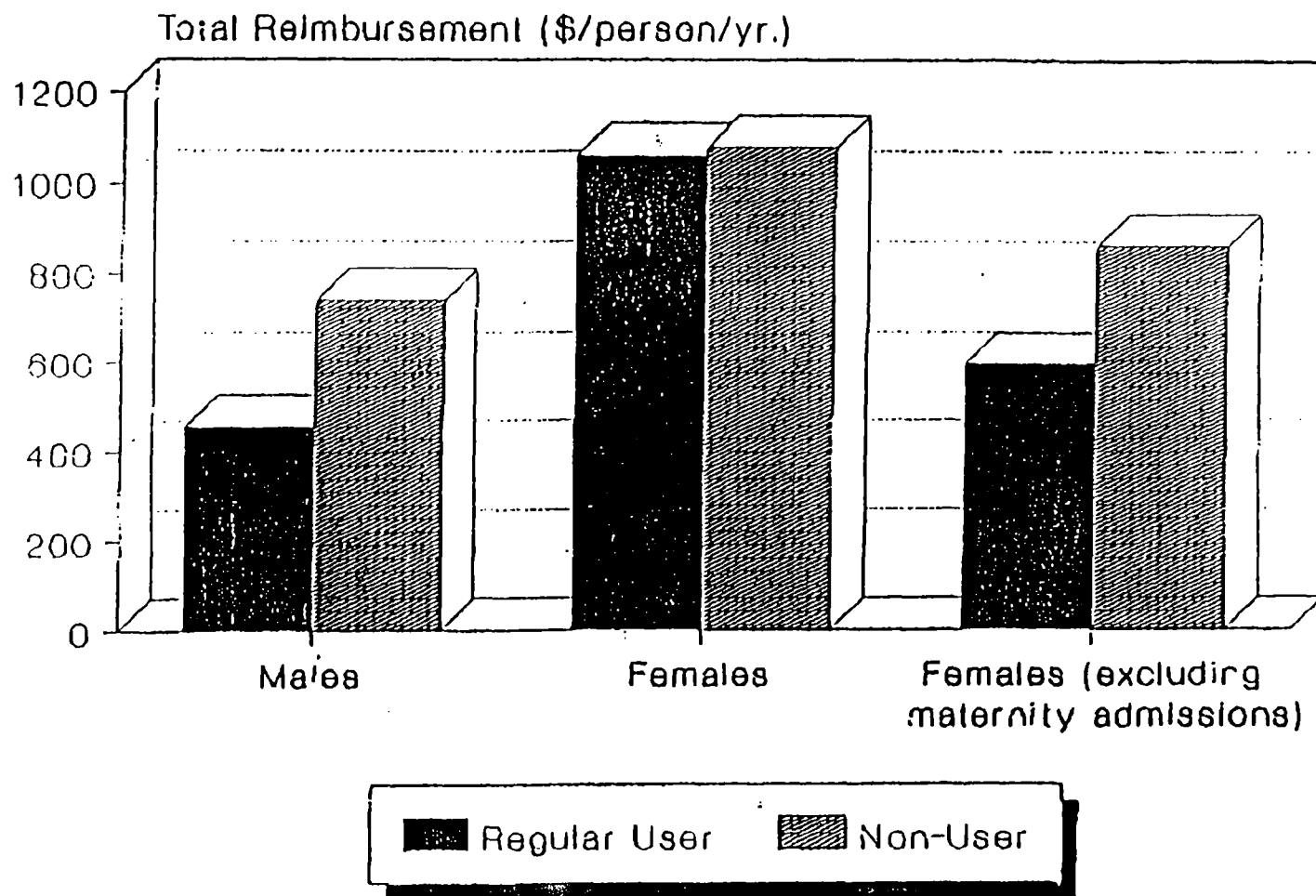
The study populations consisted of 4445 "regular users" of CHCs, a stratified sample of 19,979 non-users residing in the same ZIP codes as the users, and 2270 "occasional users" of CHCs. AFDC recipients classified as CHC users did not represent more than 8% of the AFDC recipients residing in the ZIP codes identified empirically as representing CHCs' service areas. Therefore, non-user patterns of care and costs to Medi-Cal were relatively unaffected by any self-selection bias among the recipients who chose to seek care at the CHCs. Regular users of CHCs were found to average slightly fewer months of eligibility during the year than did non-users, although all study participants except newborns had to have at least 6 months of eligibility (averages were 10.3 months for regular users, 10.8 months for non-users, and 11 months for occasional users). Therefore, with the exception of maternity cases, both unadjusted and annualized data on utilization and payments were computed (maternity case utilization and payments were not annualized).

Comparisons of total Medi-Cal payments and inpatient payments, per case and adjusted for person years, appear in Table 1. below, before and after exclusion of maternity cases. Total Medi-Cal payments per person year, by sex, and with/without maternity cases are displayed graphically in Exhibit 1.

Table 1. Medi-Cal Payments in 1989

PAYMENT CATEGORY	REGULAR USER		NON-USER	
	<u>Per Case</u>	<u>Pers. Year</u>	<u>Per Case</u>	<u>Pers. Year</u>
1. Includes Maternity				
Total Payments	\$694	852	809	945
As % Non-User	86	90	100	100
Inpat. Payments	\$270	342	315	377
As % Non-User	86	91	100	100
2. Excludes Maternity				
Total Payments	\$464	548	697	813
As % Non-User	67	67	100	100
Inpat. Payments	\$103	130	209	269
As % Non-User	49	48	100	100

TOTAL MEDICAL REIMBURSEMENTS



Three of the four CHCs studied offer comprehensive perinatal services. Because pregnant Medicaid recipients tend to seek out and utilize those CHCs which offer comprehensive perinatal services, the proportion of maternity cases among the regular users of CHCs is greater than the proportion of regular users among all eligible recipients in the service area. With the exception of maternity related services, AFDC recipients tend to incur low average costs per case to Medi-Cal. Thus, comparisons should adjust for bias caused by disproportionate use of CHCs for perinatal care. After exclusion of maternity cases, Table 1 indicates that regular use of a CHC is associated with a 33% saving to Medicaid, on both a per case and per person year basis. This amounts to an average of \$223 per regular user, or \$265 per recipient year of eligibility. Even with inclusion of maternity cases there is a saving to Medi-Cal of 14% per AFDC case and 10% per enrolled year.

About half of the savings associated with CHC regular user status is produced by reduced inpatient care, the remainder through reduced payments for outpatient care and other services. Maternity cases account for 62% of all inpatient payments among regular users of the CHC, and excluding the maternity care from the comparisons drops the proportion of all payments accounted for by inpatient payments from 40% to 24% of the total.

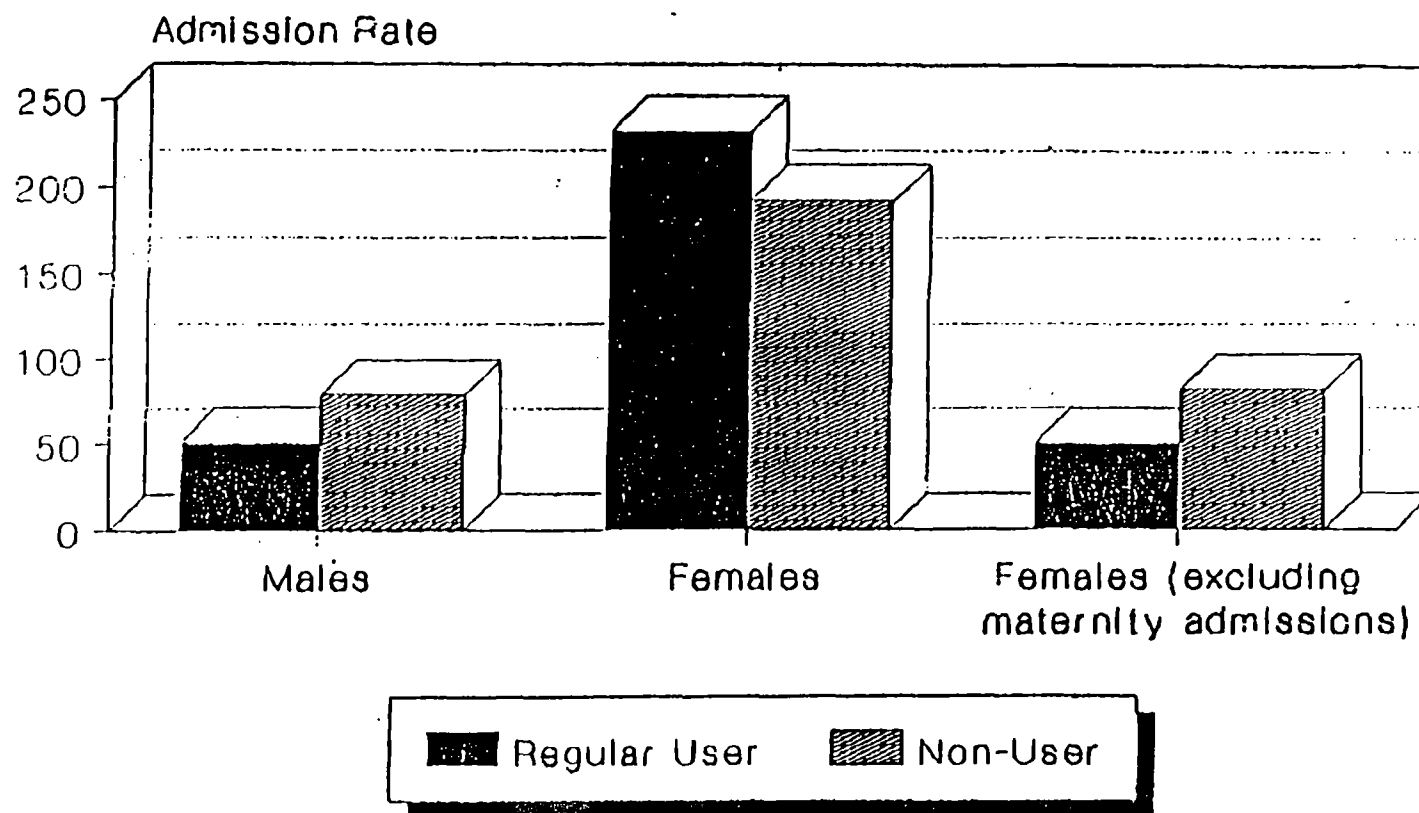
Hospital inpatient utilization rate comparisons do not exactly parallel the payment findings, primarily because inpatient maternity admissions have a short average length of stay. As shown in Table 2 below, admission rates are higher for regular users of CHCs than for non-users, except when maternity cases are excluded. Inpatient days for CHC regular users are lower, both with and without maternity cases. After exclusion of maternity cases, regular user status is associated with a 38% reduction in admissions. Admission rate and inpatient day comparisons per person year, by sex, and with and without maternity cases are graphically displayed in Exhibits 2 and 3.

Table 2. Inpatient Utilization Rates

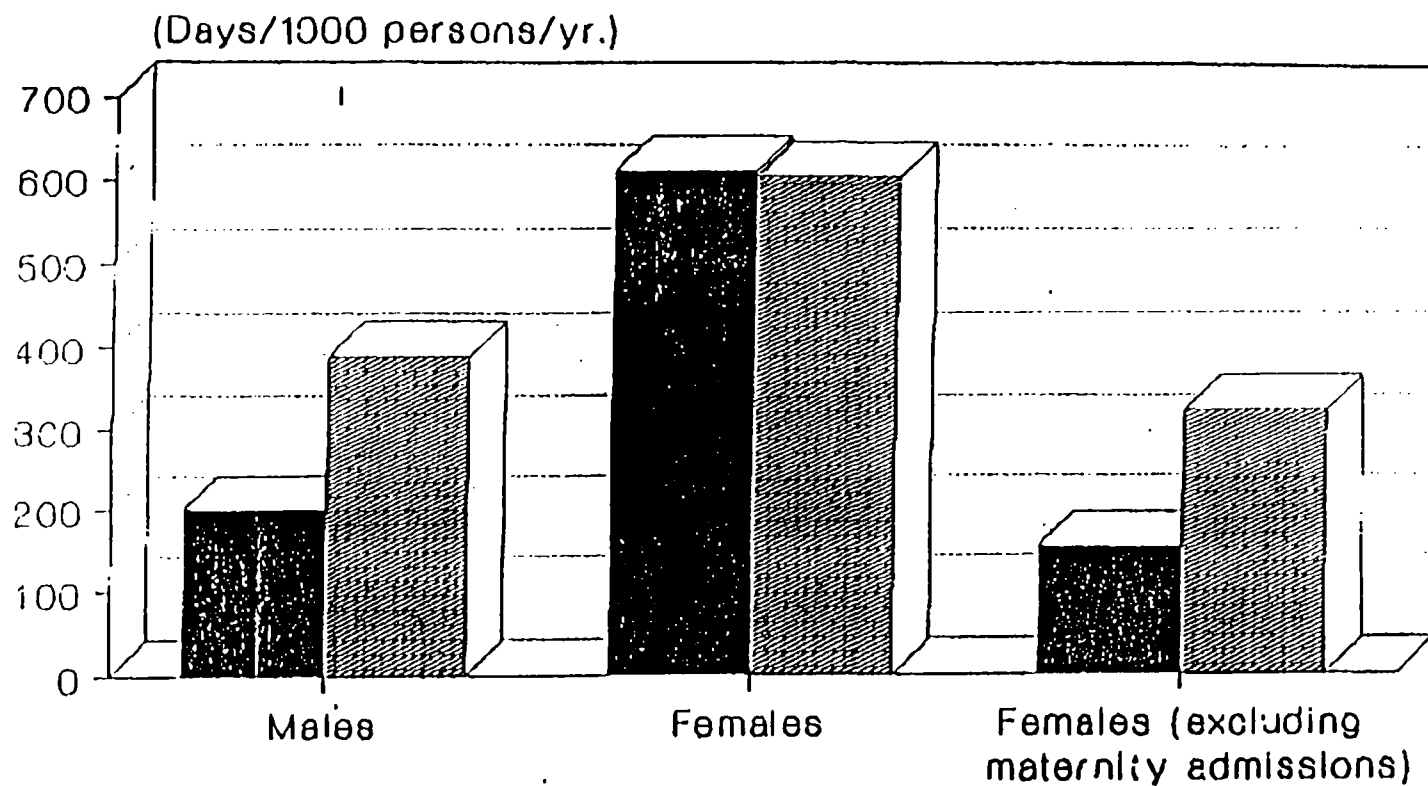
USE MEASURE	REGULAR USER		NON-USER	
	<u>Per Case</u>	<u>Pers. Year</u>	<u>Per Case</u>	<u>Pers. Year</u>
1. Includes Maternity				
Inpat. Admission (per 1000)	130	170	120	147
Inpat. Days (per 1000)	356	469	421	519
2. Excludes Maternity				
Inpat. Admission (per 1000)	38.9	50.6	62.8	80.7
Inpat. Days (per 1000)	138	180	280	360

HOSPITAL ADMISSION RATES

(Admissions/1000 Recipients/yr. Medi-Cal Eligibility)



HOSPITAL INPATIENT DAYS



Regular User

Non-User

As with the payments data, inpatient utilization is primarily for maternity care. In fact, 70% of inpatient admissions among regular users were for maternity care. Among non-users of the CHCs, however, maternity care only accounted for 47% of admissions.

Although "occasional users" represents only 34% of all CHC users, this is a high cost and utilization group. Claims history reviews for occasional users suggest that many in this group are "shoppers", some are chronically mentally ill, some appear to be homeless or street people from the array of diagnoses, while others in this group had one or two visits to a CHC, but obtained most of their care from private physicians, OPDs or ERs. Occasional users averaged two thirds more costs to Medicaid per case than did non-users, with hospital inpatient payments 90% greater. The occasional user group should be of great interest to state and federal officials because of their high cost. These recipients may represent a subgroup which could most benefit by case management services, or continuing relationship with a primary caregiver, but are unlikely to voluntarily develop such an affiliation.

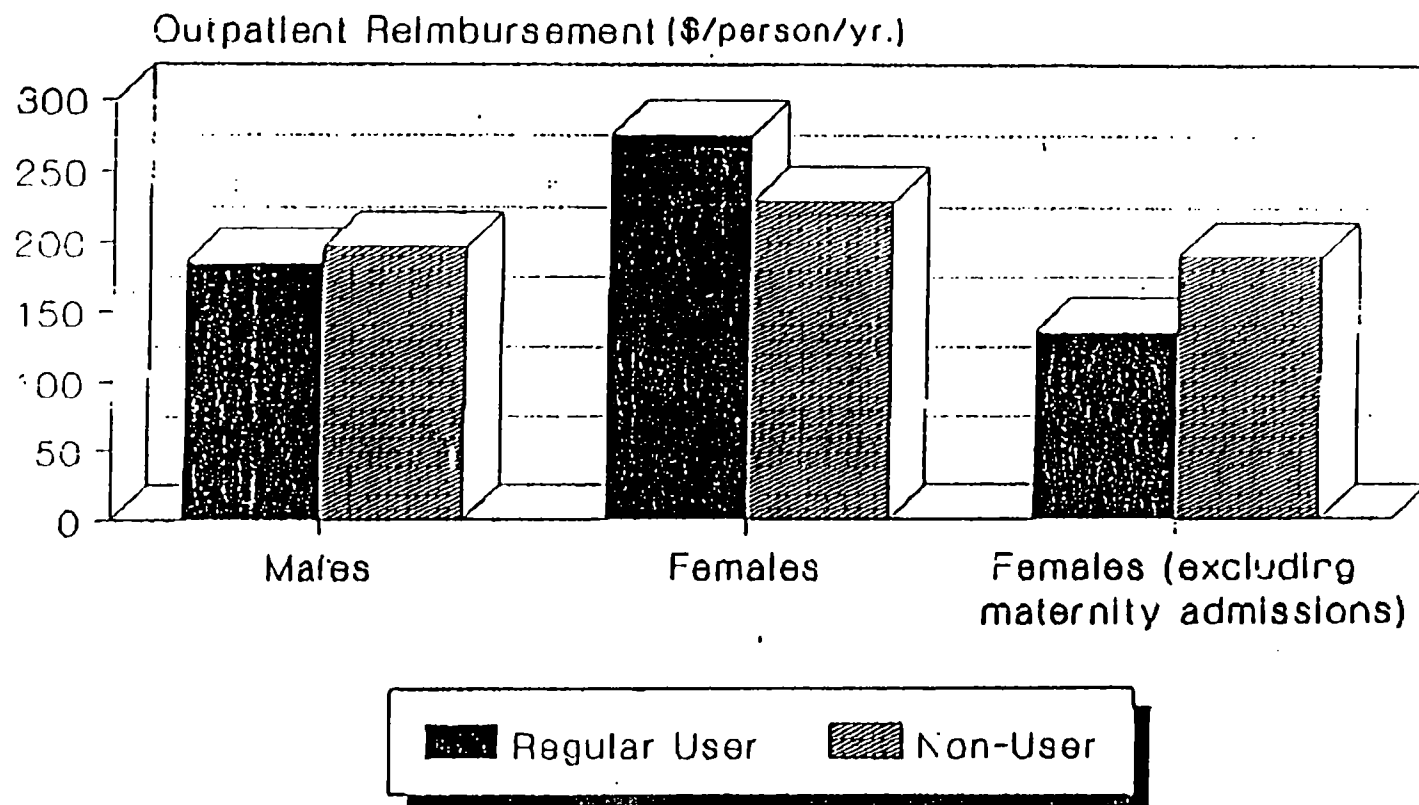
When comparing the above data on inpatient care payments and utilization to those for outpatient payments and utilization rates, similar patterns of reductions associated with CHC regular use are observed. Outpatient data appear in Table 3 below (outpatient payments represent the sum of those for OPD/ER, clinic, outpatient physician visits, pharmacy and EPSDT). Outpatient payments and pharmacy payments per recipient per year, by sex, with and without maternity cases, are displayed graphically in Exhibits 4 and 5.

Table 3. Measures of Outpatient Utilization and Payments

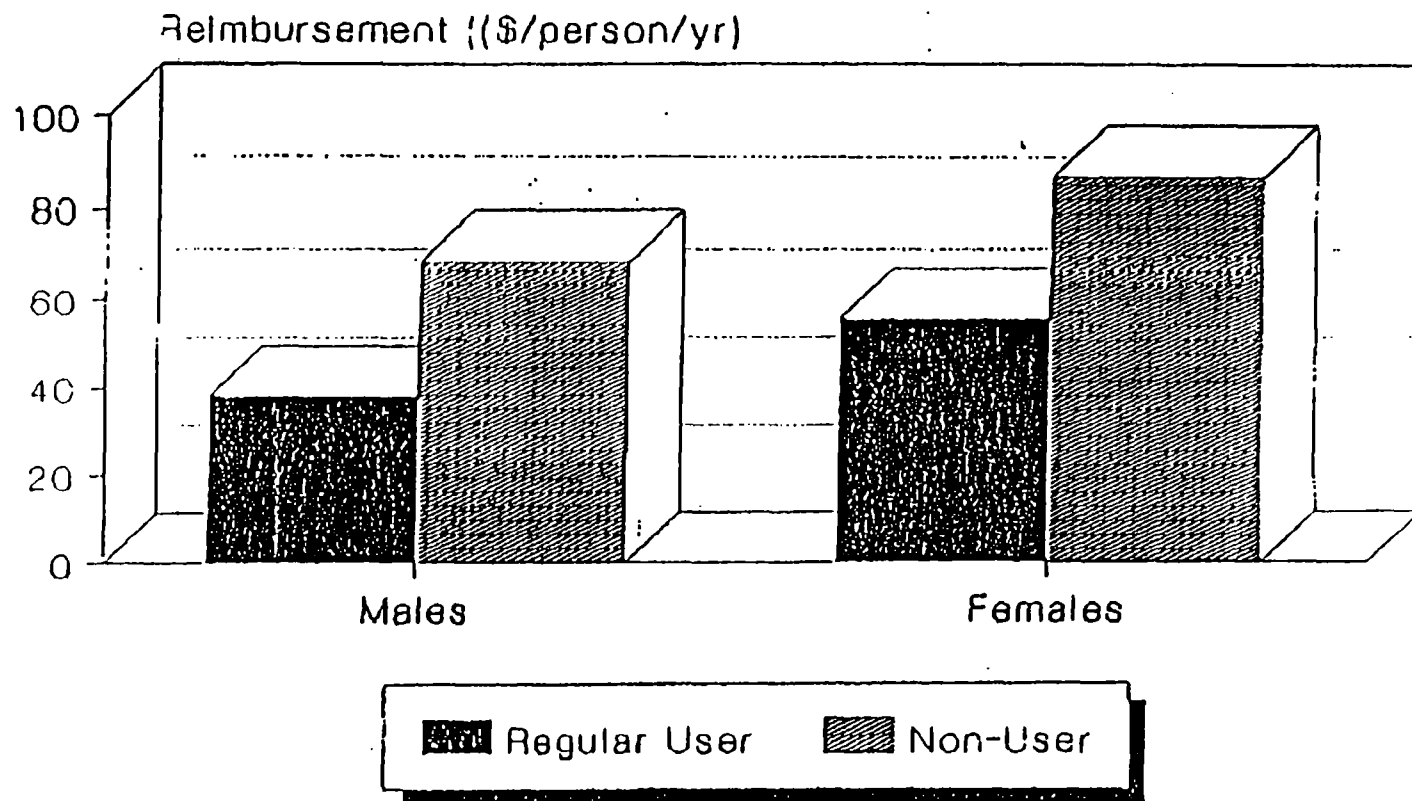
PAYMENT CATEGORY	REGULAR USER		NON-USER	
	<u>Per Case</u>	<u>Pers. Year</u>	<u>Per Case</u>	<u>Pers. Year</u>
1. Includes Maternity				
Outpat. Payments	\$206	244	194	216
As % Non-User	106	113	100	100
Prescription Drugs	\$ 45	50	75	80
As % Non-User	60	62	100	100
Medical Care Visits	5.4	6.3	5.8	6.4
As % Non-User	93	98	100	100
2. Excludes Maternity				
Outpat. Payments	\$136	152	174	192
As % Non-User	78	79	100	100

The savings in payments to Medi-Cal associated with regular use of CHCs reflect lower utilization in every category of service which was separately analyzed, except for clinic visits and EPSDT visits, which increased among regular users. The lower utilization

OUTPATIENT REIMBURSEMENTS (Per Person/Yr. of Medi-Cal eligibility)



PHARMACY REIMBURSEMENTS (Per Person/Yr. of Medi-Cal Eligibility)



rates were observed both with and without including maternity cases. However, because of the substantial costs of outpatient payments for perinatal care, outpatient payments for regular users of CHCs slightly exceed those for non-users when maternity care is included, but average 21% less (\$40 per recipient year) after excluding maternity cases.

Separate analyses were conducted of maternity cases and a statistically insignificant cost savings to Medi-Cal measured among regular users of CHCs (regular users averaged \$3261 per case compared with \$3577 per case for non-users, an 8% savings). Several chronic diseases were also selected for analysis, but the numbers of such cases were too small to permit statistically reliable comparisons on a disease specific basis.

Multivariate analyses were also conducted and used to confirm and expand upon the above described findings. Using step-wise multiple regressions to analyze the separate contributions to total Medi-Cal payments and to hospital inpatient care, it was possible to identify and measure those variables with the greatest contribution to payment and inpatient utilization measures. Regular user status of CHCs was found to produce statistically significant reductions in all of the measures tested, even when age, sex, race, maternity, selected chronic diseases, and geographic location were held constant. Maternity, chronic disease, urban versus rural location, medically needy status, and increasing age all produced statistically significant independent effects which increased Medi-Cal total payments, payments just for inpatient care, and inpatient days of care.

The findings in the present study are consistent with those from other studies reported in the literature concerning effectiveness of CHCs, and with previously conducted similar studies of Medicaid recipients who do or do not regularly utilize CHCs. The present study, however, offers many methodological improvements, extends previous studies into another state, includes both rural and urban CHCs for the first time, and confirms that findings of studies conducted a decade ago with urban CHCs are still relevant today.

It is concluded that well run CHCs provide cost savings to Medi-Cal on the order of 33% of the expected costs per AFDC case. The magnitude of these savings are large in comparison to the percent of expected cost savings usually negotiated by Medicaid agencies under capitation arrangements with managed care organizations. The cost savings diminish when maternity cases are included, since the cost for such cases is large in comparison to the average cost per case for non-maternity AFDC cases, and since the cost savings associated with regular use of CHCs for pregnant recipients is small (e.g., there are many fixed costs associated with provision of perinatal services which a provider offering case management cannot control). Statistically significant cost savings associated with CHC regular user status extend to each age group for male AFDC recipients and, after exclusion of maternity cases, to each age group for female recipients.

DRAFT FINAL REPORT

**UTILIZATION AND COSTS TO MEDICAID OF
AFDC RECIPIENTS IN NEW YORK SERVED
AND NOT SERVED BY COMMUNITY HEALTH CENTERS**

June 1994

Contract 240-90-0071

Submitted to:
Bureau of Primary Health Care
Health Resources and Services Administration

Center for Health Policy Studies
9700 Patuxent Woods Drive
Columbia, Maryland 21046

1. EXECUTIVE SUMMARY

FORWORD

This study was performed by the Center for Health Policy Studies (CHPS) under a contract from the Health Resources and Services Administration. A number of individuals within the Bureau of Primary Health Care (BPHC) provided invaluable advice concerning study design, selection of Community Health Centers for study, and assistance in arrangements for the study. We especially wish to acknowledge the vision and leadership provided by Bonnie Lefkowitz of BPHC whose continuing advocacy for the conduct of this study made it possible, and Judy Rogers who served as Project Officer. The study would not have been possible without the cooperation of the Health Care Financing Administration, the New York State Department of Social Services (NYDSS), and by the six Community Health Centers which are the focus of the study.

This report was prepared by Benjamin Duggar, Sc.D., who served as CHPS' Principal Investigator, Kyung Keel, Brian Balicki, and Evan Simpson. Peter Gallagher and Debra Southworth of the NYDSS, Division of Health and Long Term Care, Bureau of Management Reports/Research, prepared the claims, demographic, and eligibility extracts from the Claims Data Special Reporting file in conjunction with the FY1991 SURCLAIM file. The opinions and conclusions expressed in the report are those of the authors and do not necessarily represent those of the Bureau of Primary Health Care, Health Resources and Services Administration, or of the New York Department of Social Services.

1. EXECUTIVE SUMMARY

A study of 1991 health care utilization and payments by the New York Medicaid program for services provided to Medicaid enrolled persons residing in the services areas of six federally funded Community Health Centers (CHCs) was conducted. The hypothesis that those recipients whose customary source of primary care was a federally funded CHC would experience different patterns of inpatient hospitalization, and would incur lower costs to Medicaid than would those who did not use a CHC was tested. The study hypothesis was confirmed, with statistically significant reductions observed for hospital admissions, hospital inpatient days, prescription drugs, other covered services, and total payments by Medicaid for regular users of CHCs in comparison with non-users. Costs to Medicaid during federal fiscal year 1991 for regular users of CHCs averaged from 22% to 30% lower than those of non-users, the proportion depending upon whether or not maternity and newborn cases were included or excluded, and whether a weighted average cost or an average of the CHC area costs was used to compute the savings. Cost per maternity or newborn case averaged 12.7% to 14.4% less among regular users of CHCs compared with non-users.

Six CHCs were selected for study, including three in New York City, two rural and one urban upstate CHC. The CHC user populations for the study were restricted to Medicaid recipients who qualified for entitlement under the Aid to Families with Dependent Children (AFDC) category, or AFDC-like categories, and who resided in ZIP code areas identified as the primary service areas for each of the study CHCs. The comparison groups consisted of AFDC and AFDC-like recipients residing in the same areas who did not utilize the CHCs during 1991, but for whom there was at least one ambulatory visit to an alternative provider. All Medicaid paid claims for the user and non-user groups, together with the enrollment records for each recipient, served as the data source for utilization, payments, location of residence, Medicaid enrollment and demographic characteristics of recipients.

Selection of CHCs for study was restricted to those that met the following criteria:

- In compliance with federal funding guidelines, as indicated by receipt of a score of "A" or "B" on their grant application review during 1990 (about 75% of all CHC grant recipients received an A or B score in 1990),
- Saw a large number of Medicaid recipients during 1991, as indicated by Medicaid revenues of at least \$450,000 during 1991, excluding prepayment premiums, and,
- Agreed to voluntarily participate in the study.

AFDC recipients included in the study had to have at least 6 months of eligibility during the calendar year (except for newborns who only had to be eligible six months or at the end of FY 1991, and persons who expired during the year), not be institutionalized more than half of their period of eligibility, not have another third party payment source, and not have participated in a Medicaid capitation program during the study year. Medicaid eligibles

without any outpatient paid claims were not included in the study since it was not possible to identify their customary source of care.

The study was performed using the Claim Detail Special Reporting (CDSR) file in conjunction with the federal fiscal year 1991 SURCLAIM file prepared by the NY Department of Social Services (DSS), Division of Health and Long Term Care, Bureau of Management Reports/Research. Recipients with any use of any of the six study CHCs during 1991 were defined as users, but only those with 50% or more of their primary care visits provided by the CHC were classified as "regular users". Recipients with no visits to the CHC were classified as "non-users". Recipients with at least one visit to the CHC, but with less than 50% of their primary care visits provided by the CHC were classified as "occasional users". The non-users and occasional users received most of their primary care services from hospital outpatient departments (OPDs) or emergency rooms (ERs), free standing clinics, or from office-based physicians.

The study populations consisted of 17,290 "regular users" of the six study CHCs, a sample of 31,978 non-users residing in the same ZIP codes as the users, and 6,931 "occasional users" of CHCs (those with mixed sources of care). The study population averaged 11.2 months of eligibility, although all study participants except newborns and persons expiring had to have at least 6 months of eligibility. However, maternity cases and newborns averaged less than 10 months of eligibility. Further, the study populations varied among the CHCs, both as to the relative proportions of maternity cases which sought care through the CHC, and in the ratio of occasional to regular users. To meet the potential needs of the CHCs, HRSA, and other researchers the appendix to the report contains average data by CHC, computed on a per case basis (both adjusted and unadjusted for age/sex distributions), for the entire population, for the population excluding maternity and newborn cases, and for only maternity and newborn cases. Data are also presented on a per case and on a per person year basis (adjusted and unadjusted for age/sex distributions).

Comparisons of total Medicaid payments, inpatient payments and non-inpatient payments, per case, before and after exclusion of maternity and newborn cases, and for maternity and newborn cases alone, appear in Exhibit 1-1. As can be seen from the Exhibit, the savings among regular users are derived primarily from their lower cost of inpatient care, and the savings are greatest among other than the maternity and newborn cases. Maternity and newborn cases as a percentage of all cases varied widely among CHCs, and between regular users and non-users within the CHCs. However, the aggregate figures for all CHC areas combined indicated no difference in the proportions of maternity and newborn cases (16.5% of all cases among non-users and 16.4% among regular users of the CHCs).

Total Medicaid payments per person year, by sex, and with/without maternity cases are displayed graphically in Exhibit 1-2. Costs per person year are slightly higher than they are per case since, on average, cases represented 11.15 months of eligibility, and maternity and newborn cases averaged only 9.9 months of eligibility. Because the proportion of maternity and newborns, and the average months of eligibility do not vary between greatly between the aggregate regular user group and the non-user group, the percentage savings attributed to regular use of CHCs in comparison with non-use do not vary greatly when

COMPARISONS OF MEDICAID PAYMENTS
BETWEEN REGULAR USERS AND
NON USERS OF CHCs

PAYMENT CATEGORY	REGULAR USERS	NON-USERS	% DIFFERENCES*
1. All Cases			
Total \$/Case	1774	2271	(21.9)
Inpatient Care \$/Case	696	1177	(40.9)
Non-Inpatient Care \$/Case	1078	1094	(1.5)
2. All Cases, Excluding Maternity & Newborns			
Total \$/Case	1285	1735	(26.0)
Inpatient Care \$/Case	293	698	(58.0)
Non-Inpatient \$/Case	992	1037	(4.3)
3. Maternity & Newborn Cases			
Total \$/Case	4260	4977	(14.4)
Inpatient Care \$/Case	2742	3595	(23.7)
Non-Inpatient \$/Case	1518	1382	+ 9.8

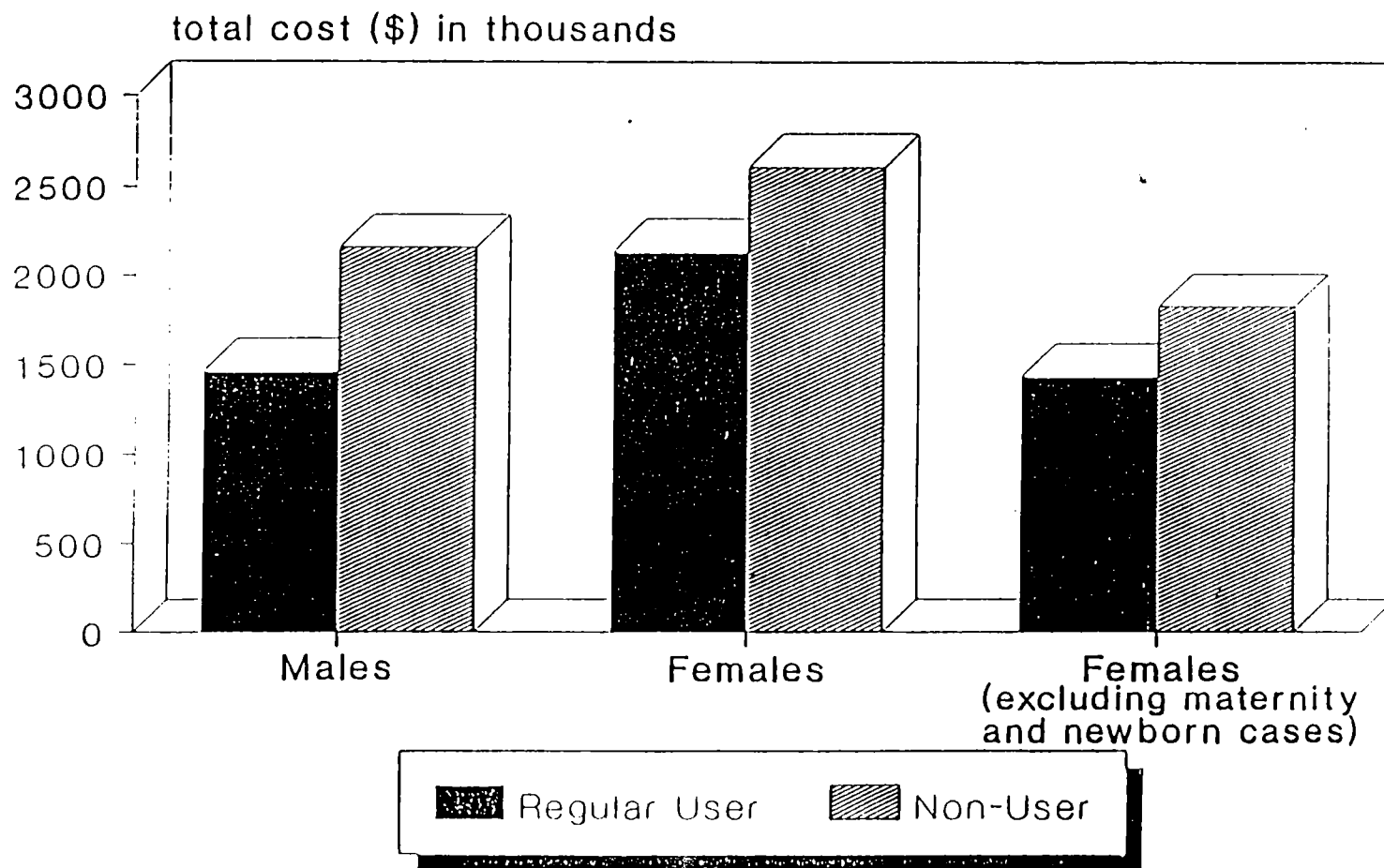
* Percent difference is the percent of the non-user dollar amount by which the regular user dollar amount is smaller () largest +.

4-4

TOTAL COST TO MEDICAID

(Total Cost/1000 persons/Yr.)

EXHIBIT 1-2



displayed on a per case, per person year, and regardless of whether or not adjusted for age/sex differences among the populations. However, these figures do vary widely among the CHCs included in the study.

Because the cost of care per recipient is substantially less for those residing outside of NYC in comparison to those living in the city, and because the two smallest CHC populations were in upstate NY, the averages which appear in the exhibits tend to be dominated by the city CHCs. That is, the overall averages for aggregate populations are weighted in a way that causes them to primarily reflect the NYC Medicaid experience. As a further check on whether this could distort the findings, averages were computed for each CHC, then averages of the CHC specific rates were computed (e.g., the CHC was used as the unit of analysis). These unweighted averages appear below:

CHC AVERAGE RATES FOR MEDICAID EXPENDITURES PER CASE

<u>Category</u>	<u>Regular User</u>	<u>Non-User</u>	<u>% Difference</u>
Total \$ per Case	\$1857	\$2458	(24.4%)
\$ Excluding all Maternity & Newborns	\$1357	\$1933	(29.8%)
\$ Maternity & Newborns Only	\$4434	\$5079	(12.7%)

By comparing these unweighted CHC averages with the weighted averages appearing in Exhibit 1-1 we can infer that the smaller CHCs achieved slightly greater savings among their regular users in comparison to the non-users residing in their service areas.

Virtually all of the savings associated with CHC regular user status in New York was produced by reduced inpatient care costs. These cost savings represented a combination of lower admission rates, lower length of stay, and admission for less costly DRGs. However, there were large savings in use of emergency rooms (about 50%), outpatient pharmacy, and for several other types of service. Regular users did make more primary care visits, the increased cost of which largely offset other outpatient cost savings.

Special analyses of high cost recipients indicated that this group occurs more frequently among non-users than among CHC regular users. However, excluding the highest cost 1% to 10% of the recipients would change the savings somewhat, but would still leave a large statistically significant cost savings associated with regular user status. Multivariate analyses were also conducted to determine if the presence of certain chronic disorders in addition to maternity and newborn status, whether or not the recipient was a medically needy recipient who gained eligibility to Medicaid through a spend-down, and recipient demographics would eliminate the favorable effects of regular user status. Although the

morbidity measures have a large effect, multiple regressions indicated that even when holding all these variables constant, regular user status still accounts for a significant negative effect on Medicaid costs and inpatient utilization.

A variety of additional analyses were attempted using DRGs for hospital admission and indicators for absence/presence of chronic conditions. None of these analyses individually produced statistically significant results, but collectively they are suggestive of an association between improved outcome of primary care and CHC regular user status.

Although "occasional users" represented only 28.6% of all recipients with any CHC use, this is a high cost and utilization group. Claims history reviews for occasional users suggest that many in this group are "shoppers", some are chronically mentally ill, some appear to be homeless or street people from the array of diagnoses, while others in this group had one or two visits to a CHC, but obtained most of their care from private physicians, OPDs or ERs. Occasional users averaged 24.5% more costs per case to Medicaid than did non-users. The occasional user group should be of great interest to state and federal officials because of their high cost. These recipients may represent a subgroup which could most benefit by case management services, or continuing relationship with a primary caregiver, but may also be the group least likely to voluntarily develop such an affiliation.

The findings in the present study are consistent with those from other studies reported in the literature concerning effectiveness of CHCs, and with previously conducted similar studies of Medicaid recipients who do or do not regularly utilize CHCs. The present study, however, offers methodological improvements, extends previous studies into another state, includes both rural and urban CHCs, and confirms that findings of studies conducted a decade ago with urban CHCs, and two years ago in California with urban and rural CHCs, but for which Medicaid reimbursement rates equaled those for office-based physicians, are still relevant today.

It is concluded that well run CHCs, even with FQHC cost-based reimbursement rates, can provide cost savings to Medicaid on the order of 30% of the expected costs per AFDC case. The magnitude of these savings are large in comparison to the percent of expected cost savings usually negotiated by Medicaid agencies under capitation arrangements with managed care organizations. The cost savings diminish when maternity cases are included, since the cost for such cases is large in comparison to the average cost per case for non-maternity AFDC cases, and since the cost savings associated with regular use of CHCs for pregnant recipients is small (e.g., there are many fixed costs associated with provision of perinatal services which a provider offering case management cannot control). Statistically significant cost savings associated with CHC regular user status extend to each age group for male AFDC recipients and, after exclusion of maternity cases, to each age group for female recipients.

**NEW YORK COMMUNITY HEALTH CENTERS (CHCS)
MEAN UTILIZATION AND MEDICAID COSTS
BY USER STATUS AND SEX**

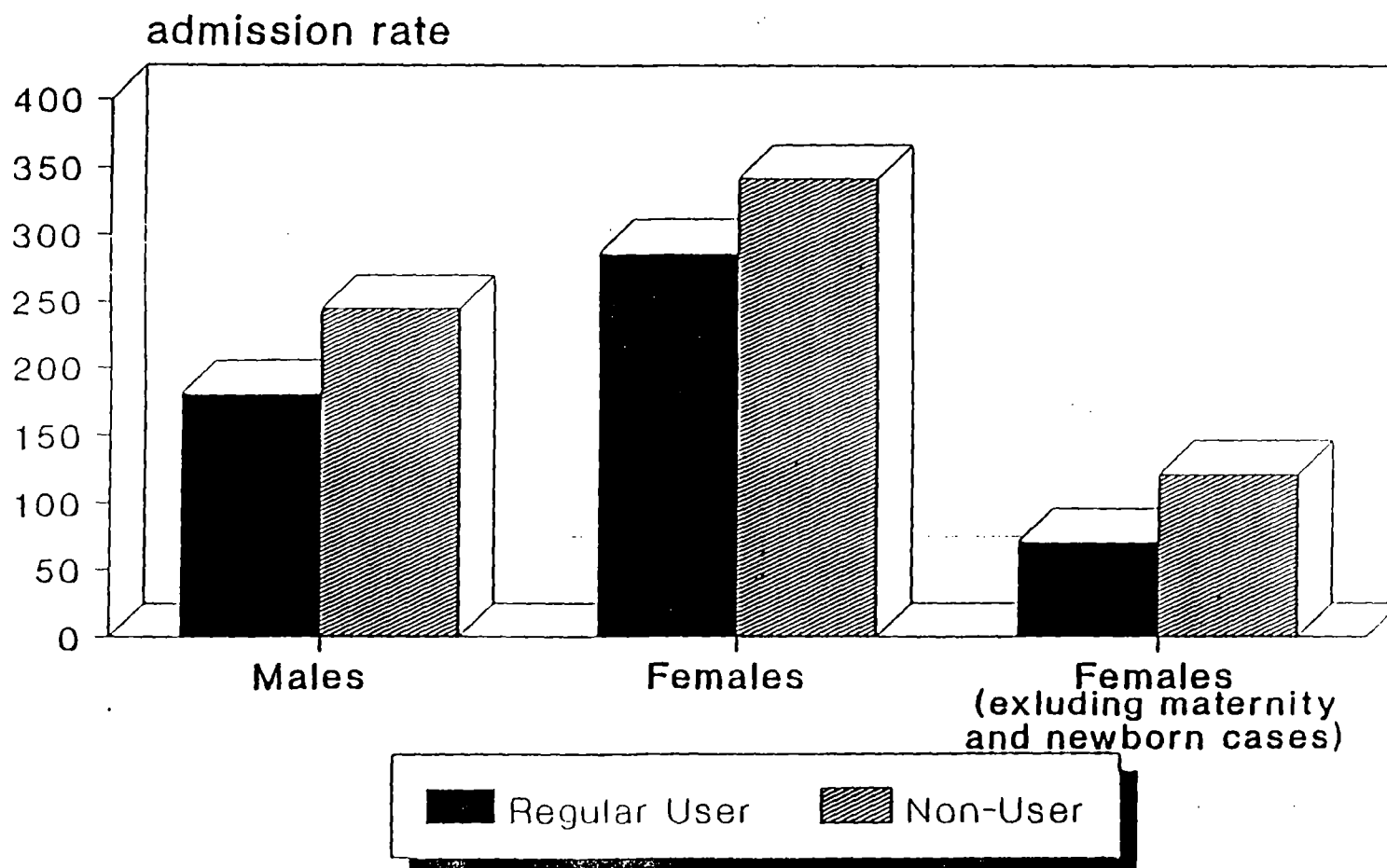
(All Figures are per 1000 persons per year except for ALOS
and Medicaid Costs which are per person per year)

	REGULAR USER			OCCASIONAL USER			NON-USER		
	Male	Female	All	Male	Female	All	Male	Female	All
Hospitalization									
Inpatient Admissions (per 1000)	181	287	252	334	372	361	245	342	306
Inpatient Days (per 1000)	850	1,188	1,076	1,752	2,061	1968	1,426	1,619	1,548
Average Length of Stay	4.7	4.14	4.27	5.25	5.54	5.45	5.82	4.73	5.06
Medicaid \$	545.16	850.67	749.12	1,319.02	1,631.72	1,537.12	1,118.09	1,352.82	1,266.33
Hospital Excluding Maternity and Newborn									
Inpatient Admissions (per 1000)	70	71	70	198	187	191	131	121	125
Inpatient Days (per 1000)	428	452	444	1146	1,356	1,290	862	867	865
Average Length of Stay	6.11	6.37	6.34	5.29	7.25	6.75	6.58	7.17	6.92
Medicaid \$	288.68	318.84	308.23	974.21	1,069.46	1,039.79	765.48	711.74	732.76

HOSPITAL ADMISSION RATES

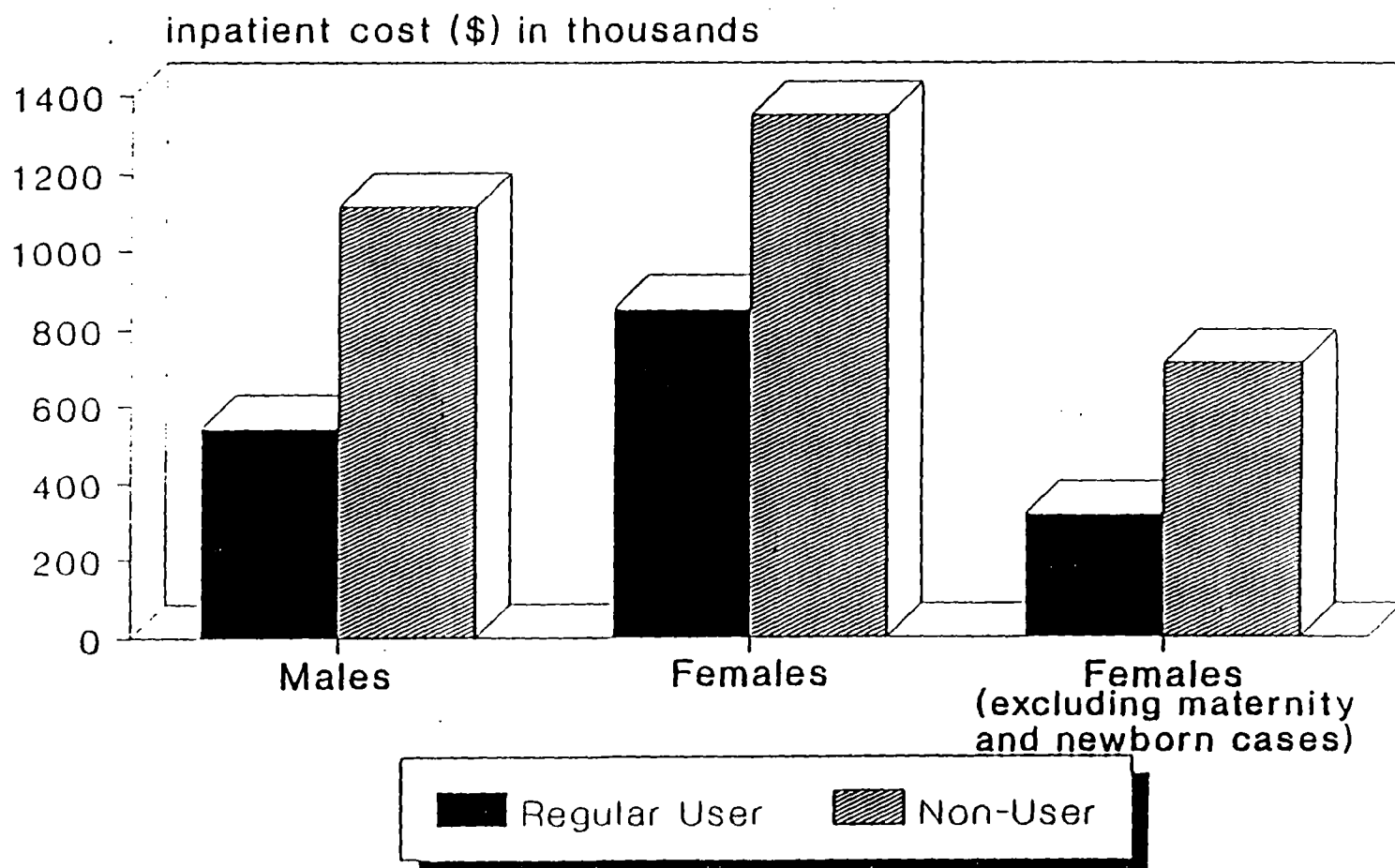
(Admissions/1000 Recipients/Yr.)

EXHIBIT 4-4



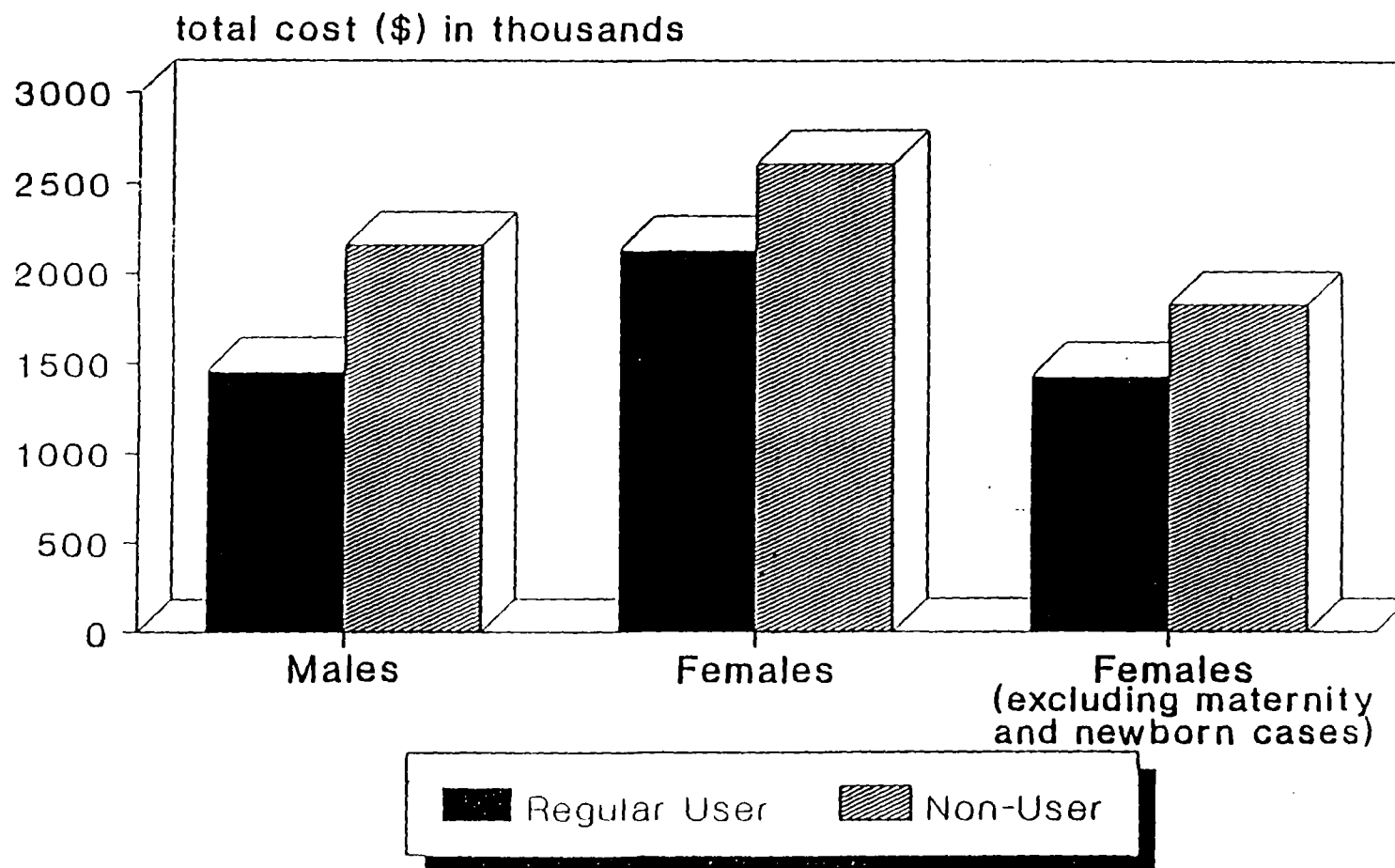
HOSPITAL INPATIENT COSTS

(Inpatient Costs/1000 persons/Yr.)



TOTAL COST TO MEDICAID (Total Cost/1000 persons/Yr.)

EXHIBIT 4-6



Patient-Mix Differences Among Ambulatory Providers and Their Effects on Utilization and Payments for Maryland Medicaid Users

MARY E. STUART, ScD,* AND DONALD M. STENWACHS, PhD†

Characteristics of the usual source of care (e.g., specialty, organizational type) are known to be related to utilization and cost levels. This study assesses the degree to which variations in utilization and cost are attributable to differences in patient mix (i.e., demographic and diagnostic characteristics). Comparisons are made with Medicaid payments with and without patient-mix adjustment among users of hospital outpatient departments, emergency rooms, Federally Qualified Health Centers and office-based physicians. The study builds upon previous work by including a well-developed set of ambulatory case-mix controls, a variety of provider types, a large number of providers, and a relatively comprehensive resource utilization component. Findings confirm significant differences in patient demographic and diagnostic characteristics among users of different types of providers. Controlling for these patient-mix characteristics explains 44% of the variation in ambulatory use, 22% in hospital admissions, and 13% in total Medicaid payments. The considerable remaining variation suggests differences in provider efficiency. For example, even after patient mix adjustment, 13% of those who rely on outpatient departments are hospitalized annually compared to 10% for users of office-based physicians. Overall findings indicate that patient-mix characteristics, as well as differences in provider efficiency, should be considered when developing and evaluating managed care and preferred provider initiatives for ambulatory care. Key words: ambulatory care; patient mix; Medicaid; practice variation. (Med Care 1993;31:1119-1127)

During the past 10 years, cost containment has become a major goal for Medicaid.

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The views presented are those of the authors.

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partment of Health and Mental Hygiene, 201 West Preston Street, Room 125, Baltimore, MD 21201.

Medicare, and private sector payers. Although it is known that widespread provider practice variation exists, scientific evidence justifying these medical care differences is lacking.¹⁻⁵ Consequently, there is growing payer interest in obtaining savings by using the most efficient providers and by avoiding unnecessary procedures or hospitalization.

This study has its origins in a Maryland Governor's Commission recommendation that the Maryland Medicaid Program identify cost-effective primary care providers.

partment of Health and Mental Hygiene, 201 West Preston Street, Room 125, Baltimore, MD 21201.

The Commission was established in the early 1980's in response to a substantial Medicaid budget deficit in Maryland. Its charge was to examine options to save money by increasing efficiency rather than by cutting eligibility or benefits. Identifying cost-effective primary care providers was one such option. The Commission's recommendation signaled what has become a widespread interest in using claims data to examine provider practice variation.⁵⁻¹⁰

This study reports the results of our efforts to address the Commission's recommendation. As a first step toward identifying cost-effective providers, we used Medicaid claims data to measure variation in utilization and payments by estimated usual source of care. Our major objectives were to measure differences in patient characteristics, including case mix, for users of all provider types delivering ambulatory care to Medicaid recipients in Baltimore, Maryland, and to determine the extent to which these differences influenced utilization and payments.

Previous studies reported variation in rates of ambulatory visits and inpatient services^{11,12} for time spent with patients; for the use of x-rays, laboratory tests, drugs,^{13,14} injections;¹⁵ for the delivery of preventive care;^{16,17} and for inpatient admissions for conditions such as hysterectomies, tonsillectomies, Caesarean sections, cardiac by-pass surgery and pneumonia.^{1,4} Researchers have used several methodological approaches to examine practice variation including: analyses of inpatient admission rates for selected procedures or conditions across geographic regions;^{1,4} comparisons of physician services during ambulatory visits^{14,18} or care episodes;¹⁹ and identification of service utilization patterns for defined populations.^{11,12,19,20,21}

Most previous comparisons among types of ambulatory providers were limited by the absence of controls for the full scope of patient morbidity. In addition, most studies did not consider total utilization and payments.

Our study extended previous work by including a well-developed set of ambulatory case-mix controls, a variety of provider types, a large number of providers, and a relatively comprehensive picture of resource utilization.

Methods

Source of Data

The study's data source was the Maryland Medicaid Management Information System, which provides a record of all claims paid for services rendered to Medicaid recipients. Within the system, an eligibility file contains the birth date, address, and enrollment history for each Medicaid enrollee. For each paid claim, a payment history file provides the patient's Medicaid number, age, race, sex, and ICD-9 diagnostic code or codes; data on the provider rendered services by code; and the payout amount. A provider file holds specialty and practice type data for each provider. Pertinent data from these three files are merged annually to create utilization and payment summaries for all Medicaid program enrollees. Data for this study were derived from the merged analysis file for fiscal year 1985.

Study Population

To construct the study population, we began with all Baltimore city residents who were eligible and enrolled for the full fiscal year 1985 in Aid to Families with Dependent Children (AFDC) under Maryland Medicaid. There were 277,292 individuals enrolled in the program at some point during the fiscal year, but only 84,687 were enrolled for the entire year. Of these 84,687 continuously enrolled individuals, 18.4% were excluded from the study population for the following reasons: they were concurrently enrolled in an HMO (8.5%)[‡] their

‡ HMO utilization data are not available in the Maryland Management Information System.

TABLE 1. Frequency and Percent Distribution of the Medicaid Population by User Type: Baltimore, AFDC Continuously Enrolled, Fiscal Year 1995

Individuals	Number	Percent
All persons	84,667	100.0
Ambulatory care users		
by usual source of care*	69,136	81.6
Office-based physician (MO)	16,536	23.9
Federally qualified health centers (FQHC)	4,506	6.5
Outpatient department (OPD)	18,229	26.4
Children & youth clinics (C&Y)	3,223	7.6
Emergency room (ER)	3,393	8.5
Hospital mixed (MIXED)	4,241	6.1
No majority (NO MAJ)	14,480	20.9
Excluded from the study	15,531	18.4
Non-users†	3,331	3.9
HMO-users‡	7,175	8.5
Other service users§	4,515	5.7
Users excluded¶	220	.3

Note: AFDC, Aid to Families with Dependent Children. Percents may not add to 100.00 because of rounding.

Source: State of Maryland Department of Health and Mental Hygiene, Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

* Individuals were assigned to the provider who provided more than 50% of their ambulatory care. Individuals in the No Majority category had no such provider.

† Individuals with eligibility and no utilization.

‡ Individuals enrolled in a Health Maintenance Organization (HMO).

§ Individuals not having ambulatory visits but receiving at least one of the following services: inpatient, lab, vision, dental, or pharmacy.

¶ Ambulatory Care Users who were excluded from the study population due to incomplete demographic data.

files contained incomplete demographic data (0.3%); they could not be assigned a source of care either because they made no visits to providers (3.9%) or used only non-ambulatory services (5.7%). The remaining 69,136 individuals, whom we characterize as "ambulatory care users," constituted the study population (Table 1).

Major Variables

We selected six major dependent variables to provide a comprehensive profile of re-

source utilization, and each of the variables was calculated per user per year. They were 1) total Medicaid payments; 2) number of ambulatory visits; 3) payment per visit; 4) the probability of an inpatient admission; 5) number of inpatient days for users with at least one hospital admission; and 6) payment per inpatient day.

Major independent variables were the estimated usual source of care and patient-mix characteristics (Table 2). The usual sources of care were outpatient departments and emergency rooms at 18 hospitals, 777 office-based physician practices, six Federally Qualified Health Centers, and four Children and Youth Clinics.[§] Measured patient-mix characteristics included: the sociodemographic factors of age, sex, and race; previous Medicaid enrollment and morbidity (case mix). Previous Medicaid enrollment measured whether or not the patient was continuously enrolled in Medicaid for the six months preceding the study period. We included this measure since utilization tended to be higher for recipients immediately following enrollment. "Case mix" denoted the range and mix of patient morbidity.

Data Analysis

To determine the impact of differences in patient mix on utilization and payments, six least squares regressions were estimated, one for each dependent variable. Additional regression models were estimated to test the sensitivity of findings to changes in definitions and measurement. The usual source of care and patient-mix characteristics were used as independent variables in these regression models (Table 2). We reported both unadjusted and adjusted means for utilization and payments in order to show the effects of adjustments for patient-mix charac-

§ Children and Youth Clinics and Federally Qualified Health Centers are Federally funded clinics, which are located in medically underserved areas and serve primarily Medicaid and uninsured patients.

TABLE 2. Independent Variables Included in Regression Models to Examine Relationships of Usual Source of Care to Utilization and Payments^a

Usual Source of Care	
Office-based Physician (MD)	
Federally Qualified Health Centers (FQHC)	
Outpatient Department (OPD)—reference category	
Children and Youth Clinic (C&Y)	
Emergency Room (ER)	
Hospital Mixed Sources (MIXED)	
No Majority Source (NO MAJ)	
Patient Mix Characteristics	
Patient Demographics	
Age	
1-2 Years	
3-5 Years	
6-11 Years	
12-17 Years	
18-22 Years	
23-44 Years—reference category	
45+ Years	
Sex	
Female	
Male—reference category	
Race	
White	
Nonwhite	
Black—reference category	
Previous enrollment ^b	
< 6 months	
> 6 months—reference category	
Morbidity (Case Mix)	
Ambulatory Diagnosis Groups (See Table 3)	

^a All independent variables are dichotomous, 0-1, with an omitted reference category, except for Morbidity (ADGs). Each ADG functions independently in the regression model as a 0-1 variable so there is no omitted reference category.

^b This measures whether the user was continuously enrolled in Medicaid for the 6 months preceding the study period.

characteristics. For unadjusted means, we tested statistical significance using the F-statistic and chi-square, and for adjusted means, we used the F-statistic. All adjusted means were derived from regression estimates in which users of outpatient departments were the reference category. We used R^2 to ascertain how much variance was explained by each of the major categories of independent variables in the regression equations.

Methodological Issues

Estimating the Usual Source of Care

In most previous investigations, the usual source of care was identified through self-reporting by surveyed recipients. In contrast, we operationally defined the usual source of care as the provider who accounted for more than 50% of a user's annual ambulatory visits. Table 1 provides the frequency and percent distribution of the study population by the user's usual care source (user type). For 20.9% of the users in the study population, a usual source of care could not be identified because no single provider received more than half of these users' visits. Most users without a majority source received care from multiple office-based physicians or from an office-based physician and a hospital clinic. Another 6.1% of the users in the study population were classified as using a "hospital-mixed source" of care. Their major care source was a hospital, but they had equally divided their visits between outpatient departments and emergency rooms. Fifteen percent of the users made only one ambulatory visit during the study year; they were assigned to the single provider type that they had used.

We examined the possibility that differences between outpatient departments and community-based providers might have been exaggerated by splitting hospital ambulatory users into three groups, i.e., outpatient, emergency room, and mixed hospital source users. To determine the effects of this splitting, we estimated two additional sets of regression models. In one set, outpatient department and hospital-mixed source users were combined. In the other, outpatient department, hospital-mixed, and emergency room users were combined.

Case-Mix Measurement

We selected Ambulatory Diagnosis Groups (ADGs) as a morbidity or case-mix measure. ADGs is the case-mix or morbidity measure used in the Ambulatory Care Groups

(ACCs) system, recently developed at the Johns Hopkins University Health Services Research and Development Center and fully described in the May 1991 issue of *Medical Care*.²²

ADCs provided both a clinically-based and person-based approach to grouping ICD-9-CM codes (Table 3). The goal was to group together conditions expected to have a similar consumption impact on health service resources. Each of over 5,000 common ICD-9-CM codes were assigned to one of 34 clusters, based on type of condition (acute, self-limited, likely to recur, or chronic); role of specialty care (generally primary care or a specialty diagnosis); and severity (clinically severe or less severe with regard to its command of resources). ADCs were developed and tested using data from four health maintenance organizations, as well as the Maryland Medicaid AFDC population. The extent to which the morbidity categories were statistically independent of each other was determined through patient-level analysis of the correlation coefficients for each pair of diagnostic categories. The correlation coefficients were found to be low, suggesting that the categories were measuring relatively independent morbidity-related attributes.²³

We were concerned about the possible effects of unmeasured differences in severity where organized systems of care, such as the emergency medical system or regionalized neonatal intensive care systems, concentrated the sickest and most costly patients in selected facilities. For the AFDC population, deliveries accounted for a substantial proportion of all admissions. For these reasons, we undertook sensitivity testing to assess the effects of certain types of individuals on utilization and payments. In the first round of sensitivity testing, we removed exceptionally high-cost users (those in the 99th percentile for total payments) and then ran the regression series again. In the second round, we estimated regression models excluding all individuals hospitalized for delivery or for neonatal intensive care.

Measuring Ambulatory Utilization

Measuring ambulatory utilization and payments per visit across provider types presented another methodological challenge. One of the problems encountered in using Medicaid claims data was that ambulatory care delivered in different settings was billed using different types of codes. For office-based physicians, each procedure performed in conjunction with a visit was billed using a specific code. In contrast, for hospital claims, individual procedures were not itemized; they were submitted as groups, or "bundles," of services performed. To obtain a comparable and comprehensive picture of ambulatory payments for patients of each provider type, we defined ambulatory payments broadly to include payments for ambulatory visits and other ambulatory services reimbursed by Medicaid. Other ambulatory services included laboratory, x-ray, and any other procedure associated with an ambulatory visit as well as pharmacy, dental, vision, hearing and transportation services. In 1987, approximately 44% of total ambulatory payments were for visits; 31% for laboratory, X-ray, and other procedures associated with ambulatory care; 16% for pharmacy; 4% for vision, dental, and hearing services; and 3% for other ambulatory services.²⁴

In addition, Medicaid may receive two claims for care provided in a hospital clinic—the hospital can bill a facility fee, and the physician can bill for physician's services. However, our analysis found that the physician component was not consistently billed. To avoid double counting, we used only facility claims to count outpatient and emergency department visits.

Findings

Patient Mix

The AFDC population in Baltimore was largely young (60.3% under 18 years of age), female (66.0%), and black (82.1%). Despite

TABLE 3. Ambulatory Diagnostic Groups (ADGs) and Examples of Common ICD-9-CM Diagnoses Falling into Each ADG

ADGs	Examples (ICD-9-CM)
1 Time Limited: Minor	Dermatitis (692.9)
2 Time Limited: Minor: Primary Infections	Acute URI (465.9)
3 Time Limited: Major	Synovitis (727.09)
4 Time Limited: Major: Primary Infections	Pneumonia (486)
5 Allergies	Allergic Rhinitis (477.9)
6 Asthma	Asthma (493.90)
7 Likely to Recur: Discrete	Vaginitis (616.10)
8 Likely to Recur: Discrete: Primary Infections	Otitis Media (382.9)
9 Likely to Recur: Progressive	Diabetic Ketoacidosis (250.10)
10 Chronic Medical: Stable	Hypertension (401.9)
11 Chronic Medical: Unstable	Coronary Atherosclerosis (414.0)
12 Chronic Specialty: Stable/Orthopedic	Chondromalacia Patellae (717.7)
13 Chronic Specialty: Stable/Otolaryngology	Hearing Loss (369.9)
14 Chronic Specialty: Stable/Ophthalmology	Retraction Disorders (367.9)
15 Chronic Specialty: Stable/Other	Polycystic Ovaries (256.4)
16 Chronic Specialty: Unstable/Orthopedic	Juvenile Osteochondrosis (732.4)
17 Chronic Specialty: Unstable/Otolaryngology	Chronic Sinusitis (473.9)
18 Chronic Specialty: Unstable/Ophthalmology	Glaucoma (365.9)
19 Chronic Specialty: Unstable/Other	Pseudotumor Cerebri (348.2)
20 Dermatologic	Acne (706.1)
21 Injuries: Adverse Effects/Minor	Ankle Sprain (843.00)
22 Injuries: Adverse Effects/Major	Tear of Meniscus (836.0)
23 Psychosocial: Major	Depression (300.4)
24 Psychosocial: Other	Adjustment Reaction (309.9)
25 Psychoneurological	Migraine (346.9)
26 Signs/Symptoms: Minor	Headache (734.0)
27 Signs/Symptoms: Uncertain	Palpitation (735.1)
28 Signs/Symptoms: Major	Chest Pain (736.50)
29 Discretionary	Sebaceous Cyst (706.2)
30 See and Reassure	Skin Scar/Fibrosis (709.2)
31 Preventive/Administrative	Routine Medical Exam (V70.0)
32 Malignancy	Malignant Skin Neoplasm (172.9)
33 Pregnancy	Pregnant State (V22.2)
34 Dental	Chronic Gingivitis (522.1)
99 All other	

Source: Weiner MP, Starfield B, Steinwachs DM and Mumford L. Development and application of a population-oriented measure of ambulatory care case-mix. *Med Care* 1991; 29:455.

the relative homogeneity of this population, the distribution of age, sex, and especially race varied significantly among provider types ($P < .001$) (Table 4.) Most notably, users whose estimated usual source of care was an office-based physician were two to four times more likely to be white than were users of hospitals or federally funded clinics.

There were also significant differences in case mix among users of different provider types. Table 3 shows that for each ADG the percentage of users by estimated usual source of care category varied significantly

($P < .01$ or $.001$). To understand this table, it is necessary to recognize that a given individual may have multiple ADGs. For example if, during the course of the year, a woman received three diagnoses—pregnancy, diabetes mellitus-stable, and schizophrenia she was counted in each of three ADG categories—"pregnancy," "chronic medical stable" and "psychosocial major." If, alternatively, she had three different diagnoses that were classified as "time-limited minor," she was counted only once in that category.

Multivariate analyses confirmed that sig

TABLE 4. Percent Distribution of Ambulatory Care Users According to Usual Source of Care by Age, Sex, Race, and Previous Enrollment, Baltimore; AFDC; Continuously Enrolled, Fiscal Year 1985

Characteristics	Usual Source of Care							Chi-square Level of Significance
	MD	FQHC	OPD	C&Y	ER	MIXED	NO MAJ	
Age								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
<2	11.3	16.9	13.1	28.7	6.9	9.9	8.7	$\chi^2_8 = 555.53$
3-5	14.5	20.5	14.1	27.6	12.9	13.7	14.5	
6-12	19.5	18.7	15.3	21.8	21.7	15.8	17.0	
12-17	15.4	13.8	12.5	15.1	18.5	12.1	12.7	
18-22	6.7	9.1	12.5	3.1	9.6	12.9	10.6	
23-44	27.9	19.2	29.3	0.4	29.1	31.5	31.3	$P < .001$
45+	4.8	1.8	2.8	0.0	1.3	2.0	2.3	
Sex								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	$\chi^2_1 = 702.95$
Male	31.8	35.3	28.5	44.6	30.8	30.2	28.9	$P < .001$
Female	68.2	64.7	71.5	55.4	69.2	69.8	71.1	
Race								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	$\chi^2_2 = 3118.70$
Black	70.7	91.7	88.3	93.6	88.6	86.9	75.7	$P < .001$
White	28.5	7.1	11.4	6.3	11.0	12.7	23.8	
Other	0.8	0.1	0.3	0.1	0.4	0.4	0.5	
Previous enrollment								
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	$\chi^2_1 = 254.18$
<6 Mo.	7.4	10.1	9.1	10.8	5.1	6.3	6.6	$P < .001$
>6 Mo.	92.6	89.9	90.6	89.2	94.6	93.7	93.4	

AFDC, Aid to Families with Dependent Children; MD, Office-based Physician; FQHC, Federally Qualified Health Center; OPD, Outpatient Department; C&Y, Children and Youth Clinic; ER, Emergency Room; MIXED, Hospital Mixed Sources; NO MAJ, No Majority Source.

Note: Individuals were assigned to the provider responsible for more than 50% of their ambulatory care. Individuals in the No Majority Source category had no such provider. Percents may not add to 100.00 because of rounding. There were 69,136 ambulatory care users included in the study.

Source: State of Maryland Department of Health and Mental Hygiene; data from the Maryland Medicaid Management Information system; data developed by the Policy and Health Statistics Administration.

TABLE 5. Percent of Users of Each Usual Source of Care in Each ADG: Baltimore; AFDC, Continuously Enrolled, Fiscal Year 1985

Ambulatory Diagnostic Groups (ADGs)	Number Users	Usual Source of Care						
		MD	FQHC	OPD	C&Y	ER	MIXED	NO MAJ
Time limited: minor	21,001	30.2	22.6	30.7	21.8	22.1	35.2	37.5
Time limited: minor-primary infections	39,357	61.8	11.1	18.1	57.3	44.1	60.5	67.2
Time limited: major	8,851	9.3	8.7	14.7	4.3	11.2	21.8	16.8
Time limited: major-primary infections	7,626	9.1	6.8	11.9	9.6	9.4	16.2	11.2
Allergies	1,081	5.7	3.0	1.0	3.9	2.9	3.9	5.1
Asthma	5,059	6.6	4.6	7.2	9.1	8.5	8.6	7.6
Likely to recur: discrete	17,917	26.4	16.4	26.1	15.9	14.1	29.2	35.5
Likely to recur: discrete-primary infections	23,692	32.2	29.9	31.8	32.8	23.1	37.3	38.3
Likely to recur: progressive	311	.5	.2	.5	.1	.4	.6	.7
Chronic medical: stable	9,428	14.6	8.7	14.6	9.5	7.0	15.8	16.4
Chronic medical: unstable	6,021	9.1	4.1	9.1	3.3	4.2	11.7	11.7
Chronic specialty: stable/orthopedic	581	.8	.4	.9	.4	.5	1.3	1.1
Chronic specialty: stable/otolaryngology	715	.7	.1	1.5	.8	.4	1.2	1.4
Chronic specialty: stable/ophthalmology	1,400	1.8	1.0	2.7	.9	.7	2.0	2.6
Chronic specialty: stable/other	59	.1	.0	.1	.0	.0	.2	.1
Chronic specialty: unstable/orthopedic	468	.7	.5	.7	.2	.5	.8	1.0
Chronic specialty: unstable/otolaryngology	1,098	1.1	.8	2.1	.3	1.1	2.1	1.9
Chronic specialty: unstable/ophthalmology	1,476	1.8	1.0	2.5	3.4	.9	2.2	2.4
Chronic specialty: unstable/other	475	.6	.6	.8	.0	.3	1.3	1.0
Dermatologic	6,276	7.4	9.5	10.2	10.4	4.1	8.5	11.1
Injuries: adverse effects/minor	15,931	18.5	11.8	19.1	14.1	33.2	37.7	30.5
Injuries: adverse effects/major	15,930	16.8	15.1	19.7	22.5	31.5	37.2	28.3
Psychosocial: major	6,631	9.8	4.9	10.2	3.7	5.7	10.0	13.6
Psychosocial: other	2,578	4.5	1.3	3.5	1.1	1.6	3.1	5.9
Psychophysiology	3,658	5.9	3.0	4.2	1.9	2.6	6.3	8.7

Signs/symptoms: minor	12,454	21.9	19.7	25.7	15.1	20.3	31.5	31.1
Signs/symptoms: uncertain	6,766	7.8	7.0	9.9	8.8	7.7	13.9	12.7
Signs/symptoms: major	20,529	26.9	22.3	30.1	26.6	19.5	35.9	17.7
Discretionary	6,592	8.4	6.0	11.0	4.1	4.9	12.4	13.1
Free and Release	464	.4	.2	1.2	.2	.4	.7	.8
Prevention/administrative	43,613	56.9	85.1	61.6	85.3	21.7	62.8	65.0
Malignancy	296	.8	.4	1.9	.1	.5	1.3	1.4
Pregnancy	9,166	7.1	9.9	22.1	6.5	7.0	16.6	11.3
Dental	1,072	1.0	1.1	1.1	3.1	1.9	2.0	2.0

Note: AFDC indicates Aid to Families with Dependent Children; KID, Office-based Physician; CHC, Community Health Center; OPD, Outpatient Department; C&Y, Children and Youth Clinic; ER, Emergency Room; MH&P, Hospital Mixed Sources; NO K&M, No Majority Source.

Statistical Significance: Chi-Square was used to test the significance of differences among source of care categories for each ADG. For each ADG, differences were significant at $p < .001$ or .01.

Independent Variables: An individual may have more than one ADG. In developing ADGs, it was determined that the correlation of coefficients for each pair of ADGs were low, and did not suggest any tendency for patients to experience any set of ADGs in tandem.²⁷ Each ADG is entered into the regression equation as a 0-1 dummy variable.

Individuals were assigned to the provider responsible for more than 50% of their ambulatory care. Individuals in the No Majority Source category had no such provider. Percentages may not add to 100.00 because of rounding. There were 69,136 ambulatory care users included in the study population.

Source: State of Maryland Department of Health and Mental Hygiene; data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

nificant differences in patient case mix among users of different provider types persisted even after controlling for variation in patient age, sex, race, and previous enrollment. Although statistical significance might be anticipated based on the large size of the study population, some of the variation in morbidity among provider types had practical significance as well. For example, outpatient department users were three times more likely to have a diagnosis of pregnancy than were office-based physician users. Individuals using outpatient departments were two to three times more likely to have a diagnosis for malignancy than were individuals using office-based physicians, federally-qualified health centers, Children and Youth Clinics, or emergency rooms. Users of office-based practices and outpatient departments were approximately twice as likely to have major psychological diagnoses or unstable chronic medical diagnoses compared to users of Federally Qualified Health Centers.

Utilization and Payments

Patient-mix characteristics had a major impact on resource utilization. However, significant differences in utilization and payments among users of different care sources persisted even after controlling for differences in patient-mix characteristics. Table 6 provides an overview of these findings. Table 7 shows unadjusted and adjusted means for utilization and payments for users according to their estimated usual source of care. Unadjusted means reflected actual utilization and payments for the study population. Adjusted means estimated utilization and payments that would have occurred if every provider had treated patients with the same distribution of patient-mix characteristics (i.e., an average Baltimore city AFDC recipient). Given that we have statistically equalized the demographic and morbidity characteristics of the population treated, the

TABLE 6. Overview of Significant Differences* in Utilization and Payments per User per Year by Usual Source of Care when Compared to Users of Outpatient Departments

Usual Source of Care	Total Users	Total \$	Ambulatory		Probability Admission	Inpatient	
			Visits	\$/Visit		Days	\$/Day
MD	16,536	-	†	-	-	-	-
FQHC	4,508	-	†	-	-	NSD	NSD
OPD (reference)	18,239	-	-	-	-	-	-
C&Y	5,238	-	-	-	-	†	NSD
ER	5,894	-	-	†	-	NSD	-
MIXED	4,211	-	-	†	-	-	-
NO MAJ	14,480	-	-	-	-	-	-

†, more than OPD users; -, less than OPD user; NSD, no significant difference; MD, Office-based Physician; FQHC, Federally Qualified Health Center; OPD, Outpatient Department; C&Y, Children and Youth Clinic; ER, Emergency Room; MIXED, Hospital Mixed sources; NO MAJ, No Majority source.

Note. Individuals were assigned to the provider responsible for more than 50% of their ambulatory care. Individuals in the No Majority Source category had no such provider. There were 69,136 ambulatory care users included in the study population.

Source: State of Maryland Department of Health and Mental Hygiene, data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

* Differences which were significant at $P < .001$, .01 or .05 in regression models for the effects of usual source of care, controlling for patient demographics (age, sex, race), previous enrollment, and case-mix (ADC's).

TABLE 7. Unadjusted Mean and Adjusted Mann¹ Utilization and Payments per User per Year by Usual Source of Care: Baltimore City, AFDC Continuously Enrolled, Fiscal Year 1985

Usual Source of Care ²	Unadjusted Mean	Statistical Significance F_0 or X^2	Adjusted Mean	Statistical Significance F-Statistic
Total payments ³		$F_0 = 209.29^{***}$		
MD	\$ 384.66		719.12	322.27***
FQHC	407.85		740.31	124.75***
OPD	1305.80		1,161.68	reference
C&Y	674.63		960.50	31.76***
ER	496.23		739.25	153.12***
MIXED	1061.03		834.15	74.27***
NO MAJ	1000.13		811.06	192.77***
Ambulatory visits		$F_0 = 443.41^{***}$		
MD	7.51		7.75	71.32***
FQHC	5.79		7.43	4.96*
OPD	7.27		7.22	reference
C&Y	5.68		6.75	27.10***
ER	2.91		5.08	622.52***
MIXED	6.78		5.53	314.23***
NO MAJ	8.07		6.38	177.66***
S/Ambulatory visit ⁴		$F_0 = 516.30^{***}$		
MD	\$ 48.04		\$ 33.91	2532.83***
FQHC	46.86		31.61	1521.91***
OPD	79.50		59.58	reference
C&Y	61.52		56.23	20.53***
ER	103.27		90.83	1950.56***
MIXED	87.33		66.42	75.39***
NO MAJ	68.37		52.02	208.34***
Probability of admission		$X^2 = 2086.62^{***}$		
MD	.07		.10	523.65***
FQHC	.07		.11	200.49***
OPD	.21		.18	reference
C&Y	.07		.13	111.51***
ER	.07		.10	239.77***
MIXED	.16		.12	103.44***
NO MAJ	.14		.12	230.97***
Inpatient days ⁵		$F_0 = 4.79^{***}$		
MD	5.95		5.41	5.56*
FQHC	5.77		6.05	.13
OPD	5.79		6.29	reference
C&Y	8.87		7.87	6.71**
ER	5.66		5.42	2.20
MIXED	5.46		5.14	6.07*
NO MAJ	5.91		5.58	5.02*
S/Inpatient day ⁶		$F_0 = 4.78^{***}$		
MD	515.68		542.06	23.23***
FQHC	522.50		519.31	2.31
OPD	594.13		566.04	reference
C&Y	500.66		515.51	.64
ER	540.55		568.49	8.34**
MIXED	547.18		560.33	6.60*
NO MAJ	542.36		560.54	12.13***

Note: Full regression results are available in Stuart, M: Practice Variation in Ambulatory Care: Utilization, Cost and Preventive Care for Medicaid Users. Doctoral dissertation, Johns Hopkins University, Baltimore, 1988.

Source: State of Maryland Department of Health and Mental Hygiene: data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

Statistical Significance

*** $P < .001$.

** $P < .01$.

* $P < .05$.

¹ Utilization and payments that would have been made if patients with the same distribution of characteristics had been treated by every provider. Unadjusted means were regression adjusted for patient demographic characteristics (age, race, sex), previous enrollment, and morbidity (ambulatory diagnosis groups). The reference category was outpatient department users.

² Individuals were assigned to the provider responsible for more than 50% of their ambulatory care. There were 69,136 ambulatory care users included in the study population.

³ Total payments includes all ambulatory and all inpatient hospital payments.

⁴ Ambulatory payments included visits, ancillaries (x-ray, lab) and other services (pharmacy, etc.).

⁵ For users with at least one inpatient admission ($n = 8,066$).

adjusted mean differences by provider category may be attributed largely to treatment or payment differences between types of providers.

Figure 1A illustrates how mean total payments per person per year were more than twice as high for users of outpatient departments as for users of office-based practices and Federally Qualified Health Centers and how these differences were reduced (48% and 39% respectively) when the means were adjusted for patient-mix characteristics. Despite these reductions, the adjusted mean total payments per user per year remained significantly higher for users of outpatient departments compared to users of all other provider types ($P < .001$).

Higher admission rates were a major factor accounting for the high total payment for hospital outpatient departments compared to other provider types. Figure 1B illustrates the impact of patient-mix adjustment on the probability of hospitalization for users of the three provider types. The unadjusted probability of inpatient admissions was 0.21 for users of outpatient departments compared to 0.07 for both users of office-based practices and users of Federally Qualified Health Centers. Adjusting for patient-mix characteristics accounted for approximately half of these differences. Still, the probability of admission remained significantly higher for users of outpatient departments when compared to users of all other provider types ($P < .001$).

Ambulatory visits per user per year were lower for users of Federally Qualified Health Centers relative to hospital outpatient users before patient-mix adjustment, but were significantly higher after adjustment ($P < .001$). After patient-mix adjustment, users of office-based practices and Federally Qualified Health Centers had 7.75 and 7.43 ambulatory visits per user per year, respectively, compared to 7.22 for hospital outpatient users (Fig. 1C). Users whose estimated usual source of care was an emergency room had both the lowest unadjusted mean (2.81)

and the lowest adjusted mean (5.08) for ambulatory visits per user per year.

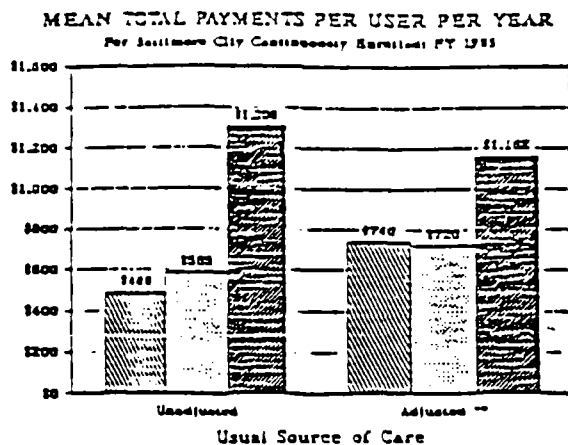
Findings regarding inpatient days per users of Children and Youth Clinics illustrated how clusters of very sick patients may influence utilization rates. The adjusted mean number of inpatient days per year for users of Children and Youth Clinics exceeded by 1.59 days the mean for users of hospital outpatient departments. This difference may be linked to the role played by a major Children and Youth Clinic in Baltimore in providing follow-up care to children discharged from neonatal intensive care.

We addressed these and other similar concerns by conducting additional analyses that excluded high-cost users, women hospitalized for deliveries, and users of neonatal intensive care services. With few exceptions, differences that were significant in the original regression models remained significant during sensitivity testing. Most notably, differences in the probability of admission remained significantly higher for users of outpatient departments compared to users of each of the other provider types studied ($P < .001$). Similar results were obtained from sensitivity analyses regarding the definitions of hospital clinic users. Users of office-based practices and Federally Qualified Health Centers continued to have significantly lower probabilities of admission and costs compared to hospital clinic users ($P < .001$).

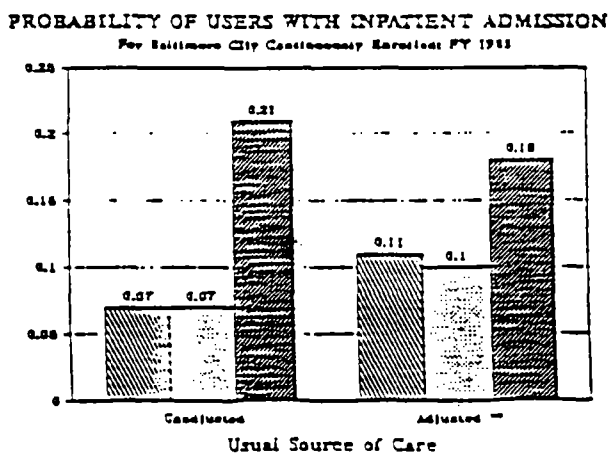
Proportion of Variance Explained by Major Independent Variables

Since one objective of this study was to better understand the effects of patient-mix differences on utilization and payments, we measured the variance explained by each of the major categories of independent variables in our regression models. To observe the effects of adding case mix to the other independent variables in the regression equation, we specified three models for each dependent variable. Model 1 included only the usual source of care variables. In the

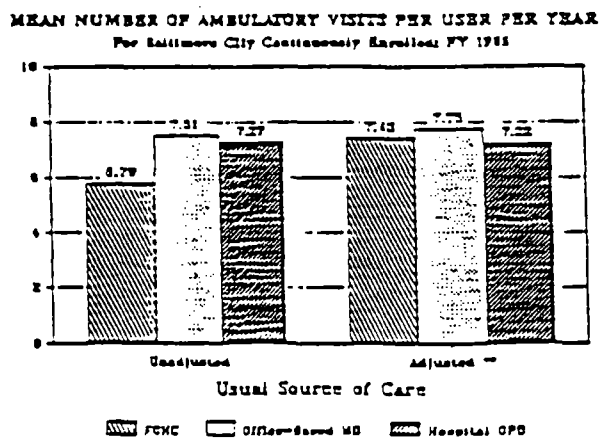
A.



B.



C.



** Note: Patient mix adjusted for sex, age, race, previous enrollment, morbidity (ADGs).

FIG. 1. Provider's patient-mix differences. Key: FQHC, Federally Qualified Health Center; MD, physician; OPD, outpatient department.

Source: State of Maryland Department of Health and Mental Hygiene, Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

TABLE 3. Comparison of R^2 for Regression Models I, II and III for each Dependent Variable: Baltimore City, AFDC, Continuously Enrolled, FY 1985

Dependent Variable ^a	Model I ^b	Model II ^c	Model III ^d
	R^2	R^2	R^2
Total payments	.02	.05	.13
Ambulatory visits	.04	.11	.44
Payment per visit	.13	.16	.20
Probability of admission	.03	.09 ^e	.21
Inpatient days	.00	.03	.08
Payment per inpatient day	.02	.04	.10

Note: Individuals were assigned to the provider responsible for more than 50% of their ambulatory care.

Source: State of Maryland Department of Health and Mental Hygiene; data from the Maryland Medicaid Management Information System; data developed by the Policy and Health Statistics Administration.

^a All variables were calculated per user per year.

^b Independent variables include usual source of care: Office Based Physician, Federally Qualified Health Center, Outpatient Department, Children & Youth, Emergency Room, Hospital Mixed Source, and No Majority Source.

^c Independent variables include usual source of care and patient age, sex, race, previous enrollment.

^d Independent variables include usual source of care, patient age, sex, race previous enrollment and morbidity (ADGs).

Model II, we added patient variables for age, sex, race, and previous enrollment. In Model III we added case-mix variables (ADGs) in addition to the variables already in the first two models.

Table 3 shows the R^2 for each model. R^2 indicates the proportion of variation in the dependent variable explained by all the independent variables in the regression model. Possible values of the measure range from +1 to 0. If R^2 is equal to 1, the independent variables would completely account for variation in the dependent variable. If R^2 is equal to 0, the independent variables would account for none of the variation in the dependent variable.

With the exception of payments per ambulatory visit, Model I explained little of the variance for any of the major dependent variables. When user demographic charac-

teristics and previous enrollment were added (Model II), R^2 increased for each dependent variable. For all dependent variables (except payments per visit), the greatest contribution to R^2 came from adding the case-mix measure, ADGs, to the regression model (Model III). Total R^2 for the full model (Model III) was highest for ambulatory visits (0.44) and relatively higher for probability of admission (0.21), and payments per ambulatory visit (0.20) than for total payments (0.13), inpatient payments per day (0.10) and inpatient days (0.08).

Discussion and Implications

Our findings confirmed that patient-mix characteristics, and especially case mix, were major factors explaining variation in resource use among users of different care sources, but that significant differences remained even after adjusting for these factors. As Table 9 shows, our findings were largely consistent with those obtained in previous studies. However, this study differed from these studies in that it compared total utilization and payments over an extended period of time for all users, of all provider types, for a defined population. In addition, it used a case-mix measure that considered all diagnoses identified over the course of a year. As Table 9 illustrates, previous studies comparing utilization among fee-for-service ambulatory care providers were limited by the narrow range of care settings compared and/or by the use of less than comprehensive utilization or case-mix measures. The present study's unusually comprehensive examination of the problem was achieved through the combined use of ADGs as a case-mix measure and claims data obtained from a large administrative system for all, rather than for a sample, of continuously enrolled Medicaid AFDC users over the course of a full year. This profile contained all services billed to the Medicaid program consequently, it was not limited by patient or provider recall.

TABLE 9. Features of Research^a Comparing Case-Mix and Utilization Among Fee-for-Service Ambulatory Care Providers

Features	Type of Study ^b					
	Kravitz et al. (1992) ¹¹ Greenfield et al. (1992) ¹⁰	McDevitt/ Dutton et al. (1989) ¹²	Cherkin et al. (1987) ¹³	Lion/Altman (1982) ¹⁴ Lion/Malbon et al. (1985) ¹⁵	Wennberg (1984) ¹	Held/ Schwartz (1983) ¹⁶
Range of care setting comparisons	Limited—Private MDs x Practice Type; HMO	Limited—OPD vs. Physician's Office	None—Internists vs Family Physicians	Limited—OPD vs Private MD	None—compares geographic areas	Limited—OPD vs Private MD
Measures total utilization over a defined period of time	Yes—Rates estimated	No—Episodes of Illness for Selected Conditions	No—selected procedures and time spent	No—Time spent	No—Inpatient Admissions	No—Inpatient
Type of case-mix measurement	Functional Status, Chronic Conditions	Prior Utilization	None	Ambulatory Visit Groups	None	Pregnancy
Findings regarding:						
(a) Case-mix differences	(a) Yes	(a) Yes	(a) N/A	(a) Little ^c	(a) N/A	(a) Yes
(b) Resource utilization differences	(b) Yes	(b) Yes	(b) Yes	(b) Yes	(b) Yes	(b) Yes

^a This is not intended to represent a comprehensive review of previous research but rather to provide an overview of the types of studies which have addressed one or more of the dimensions which are the primary focus of this study.

^b See references for full citations for these studies.

^c Lion and Altman (1982) reported that there was little difference in the case-mix seen in outpatient departments and physicians offices. However, Lion and Altman excluded visits to obstetricians/gynecologists which would have eliminated most diagnoses for pregnancy—the major case-mix difference between users of outpatient departments and office based physicians found in our study.

Strengths and Limitations of the Case-Mix Measure

The absence of a comprehensive case-mix measure has been a major criticism of previous research. In light of our R^2 results and sensitivity testing we believe ADGs provide a reasonable measure of case mix for comparing the probability of hospitalization among providers as well as a strong measure for ambulatory utilization. ADGs did not do as well when there was a concentration of extremely ill cases in one usual source of care as frequently occurs in regionalized trauma and neonatal systems. We believe that further examination of provider differences with regard to inpatient utilization, using Diagnosis Related Groups (DRGs) as a case-mix measure, would be a useful focus for future research.

Patient Characteristics Influencing Resource Utilization

The patient characteristics measured in this study included those that were most important in explaining variance in health care utilization for a Medicaid population.²³ However, there were other patient-related variables that we would have liked to measure but could not, due to the limitations of claims data. These included undiagnosed/unreported morbidity, health risk behaviors, and attitudes toward care seeking. ADGs measured the prevalence of diagnosed morbidity. A diagnosis could not be counted in this study if the person with the condition did not seek and receive care if the condition was not diagnosed, or if the diagnosis was not recorded on the Medicaid claim. In addition, knowledge regarding health care services and general health beliefs and attitudes have been identified as predisposing variables that are related to the use of ambulatory services.²⁴

Provider Characteristics Influencing Resource Utilization

Provider characteristics other than those measured may have influenced resource utilization. The low extent of explained varia-

tion (R^2) in regression Model I, where the estimated usual source of care was the sole category of independent variable, indicated there was considerable variation in utilization and payments within provider categories. Other factors that may interact with provider type to influence physician practice patterns include financial incentives,^{20,27} community location,²⁸ solo versus group practices,^{11,29,30,31} being a Federally Qualified Health Center,^{32,33} and physician specialty. Reportedly, pediatricians provide more preventive care and prescribe fewer drugs than general practitioners,³³ and internists order more tests than family and general practitioners.^{14,20,34,35} Linn et al.³⁶ found that medical specialty interacts with level of training or location of practice, resulting in physician subgroups who order workups of very different size and costs.

Hospital site and hospital teaching status have been found to be associated with higher utilization and costs.^{18,34,37,38} Gold and Greenlick³⁹ found that even in a prepaid health plan hospitalization rates for hospital based internists were higher than for internists in freestanding clinics. Consistent with our findings, one of the most striking and persistent effects associated with use of hospital outpatient departments is high hospitalization rates.^{18,19,25,34,39} After examining episodes of care for selected tracer conditions in the Michigan Medicaid population, McDewitt and Dutton found the probability of admission was 62% to 150% greater for patients initially seen in an outpatient department compared to those first seen in physicians' offices. They concluded that outpatient care was more costly when compared to care in physicians' offices, not only because of price, but also because continuity of care was less common and the likelihood of hospital admission was substantially greater.¹⁹

Interpreting Payment Data

Since total Medicaid payments were a function of both utilization and price, con-

parisons based on payments alone must be interpreted with caution. In Maryland, Medicaid paid higher rates for ambulatory care in hospitals than in physicians' offices. The Maryland Medicaid Program was legally mandated to pay cost-based rates for both hospital outpatient (including emergency) and inpatient services. By contrast, fees for physicians were established through the state budget process. In 1985 the average payment for a physician visit was \$18.00 compared to \$39.00 for a hospital outpatient visit.⁴⁰

Generalizability

Care should also be taken in generalizing from our study population to other populations. This study included only people who were users of services, defined as individuals with at least one visit to an ambulatory care provider. This distinction is particularly important if the reader is attempting to compare findings regarding utilization or payments to HMO utilization or payments, or to make comparisons to national population based data. In both instances, rates are typically calculated for the entire population, including users and nonusers. In addition, the study population was an AFDC population in a large urban area where access to care did not appear to be a problem. The Medicaid AFDC population differed in both demographic and morbidity characteristics from other Medicaid populations such as the disabled and poor elderly who received Supplemental Security Income (SSI). It can be expected that utilization rates would have varied for these diverse populations. Finally, the study population was continuously enrolled on Medicaid for at least one year. Utilization levels would most certainly have differed for individuals who were enrolled sporadically or only briefly.

Policy Implications

In light of the compelling need to contain Medicaid costs, findings indicating that ex-

penditures for users of office-based physicians and clinics are less than for users of outpatient departments may make the idea of limiting Medicaid coverage for hospital outpatient departments appealing. However, clusters of very sick people and people with special needs receive care in outpatient clinics. It may be particularly difficult to find private providers who are equipped and willing to care for some of these patients, such as children with psychiatric problems and women with high-risk pregnancies.

A recent Maryland Medicaid initiative constructively addressed this dilemma. Based in part on findings from this study, Maryland Medicaid established a managed care program known as the Maryland Access to Care Program (MAC), in which Medicaid recipients select a primary care provider who is responsible for providing or preauthorizing almost all care.

To encourage participation by office-based physicians and federally-qualified health centers, substantial fee increases have been implemented for these providers. Data on patient-mix and utilization differences associated with provider type were used to model the financial impact of these fee increases using various assumptions about provider selection patterns.⁴¹ Hospital outpatient clinics were given the opportunity to become MAC providers in light of the care they provided for patients with special needs. However, hospital clinics, like other MAC providers, must meet standards designed to improve continuity and assure adequate preventive care. In addition, Medicaid is using claims data to generate feedback on practice variation for MAC providers and program administrators. Through this approach, Maryland Medicaid is taking steps toward improving the cost effectiveness of primary care with minimal disruption of access for patients with special needs.

Conclusion

These findings indicate that case-mix adjustment is as necessary a step in the devel-

opment and evaluation of managed care and preferred provider arrangements for ambulatory patients as it has proved to be in evaluating inpatient care. Findings suggest differences in provider efficiency. These need to be examined further to begin to understand how efficiency relates to effectiveness and quality of care.

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Costs vs Quality in Different Types of Primary Care Settings

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Objective.—To determine the relationship between efficiency in use of resources and quality of care provided by physicians serving as the usual source of care for patients in a state Medicaid program.

Design.—Retrospective quality-of-care review of 2024 outpatient medical records of 135 providers sampled from system-wide Medicaid claims data in Maryland.

Subjects.—Providers in three types of practice settings (hospital outpatient clinic, community health center, and physician's office) were stratified into three case mix-adjusted resource use groups (high, medium, and low). A sample of patients with the diagnoses of diabetes, hypertension, asthma, well-child care, or otitis media were identified from Medicaid claims forms from visits during 1988. Case mix was controlled by the application of the ambulatory care groups, a method that characterizes populations according to their burden of morbidity.

Main Outcome Measures.—Nurses from the local peer review organization audited medical records using explicit criteria for quality of care in several categories: evidence of impaired access, evidence of compromised technical quality, evidence of inappropriate care, outcome of care, and several generic indicators of quality. Well-adult care was assessed for patients with the adult diagnoses.

Results.—Although there were some systematic differences by type of facility in some aspects of quality of care (more access problems for patients in hospital clinics and more technical quality problems for patients in office-based practice), there were no consistent differences in quality of care overall for patients in different types of settings and no consistent relationships between cost-efficiency and quality of care. However, patients in medium-cost community health centers had the best or second best scores for most of the 21 comparisons of type of quality assessed.

Conclusions.—Quality of care provided for common conditions in primary care is not associated with costs generated by providers. Policies directed toward the choice of low-cost vs high-cost providers will not necessarily lead to a deterioration in the quality of care. States can both improve quality and lower costs by consistent monitoring of programs over time. The finding of generally higher quality of care for patients in medium-cost community health centers deserves further study.

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COSTS and quality of care are often posed as competing considerations in reform of the health care system. Cost-

containment advocates generally assume that physicians and health care providers who use a relatively large quantity of medical resources to manage their patients may be providing unnecessary services and possibly increasing the likelihood of iatrogenic problems. They also contend that providers who use fewer services are assumed to be providing an adequate and basic level of services, above which there is little marginal gain. In contrast, critics of cost-containment efforts to reduce use of health services believe that better medical practice requires a generally high use of resources. Managed care organizations are eager to form relationships with low-cost pro-

viders and avoid higher-cost providers in an attempt to control the cost of health care. Therefore, the nature of the association between costs and quality of care is of considerable interest from both a clinical and policy perspective.

For editorial comment see p 1951.

With few exceptions, most studies of variability in patterns of clinical practice have involved hospitalized patients, have been limited to single conditions or medical services, or have been limited in the degree to which they account for differences in case mix.¹ Although many studies have compared the quality of care in different types of outpatient settings, including some large-scale recent studies,^{2,3} they have not considered concomitant differences in the generation of costs. Leape et al⁴ addressed the issue of variations in costs of care for Medicaid beneficiaries across 23 different geographic areas and found no relationship between costs and rates of inappropriate care.

We performed a study to assess the extent to which differences in costs of care, when adjusted for case mix, are associated with differences in the quality of care provided to both adult and child patients with various common conditions under different types of organizational arrangements: office-based practice, hospital outpatient facilities, and community health centers (CHCs).

METHODS

Study Design and Patient Population

The study design was a retrospective quality-of-care review of outpatient medical records at physician offices, CHCs, and hospital outpatient facilities (including emergency departments) sampled from system-wide Medicaid claims data in the state of Maryland. The design was implemented within a general investigation of variation in ambulatory care use and costs for patients covered by the Maryland Medicaid program both before and after adjustment

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Reprint requests to Division of Health Policy, The Johns Hopkins University, 624 N. Broadway, Fourth Floor, Baltimore, MD 21205-1996 (Dr Starfield).

Provider and Diagnosis	Cost Level			Total
	Low	Medium	High	
Office-based physicians (n=106)				
Asthma	89	45	72	206
Diabetes	83	44	67	194
Hypertension	184	71	126	383
Otitis media	66	83	86	235
Well care	25	12	40	77
Total	447	255	393	1095
Community health centers (n=10)				
Asthma	17	15	24	56
Diabetes	15	10	20	45
Hypertension	23	12	21	56
Otitis media	20	10	21	51
Well care	10	8	14	32
Total	85	55	100	240
Hospital outpatient facilities (n=19)				
Asthma	42	34	55	131
Diabetes	44	29	56	129
Hypertension	82	26	46	154
Otitis media	86	36	56	178
Well care	22	23	52	97
Total	276	148	265	689
Overall total	808	458	758	2024

*Cutoff points for the observed-to-expected ratios for lowest 30th percentile and the highest 70th percentile are 0.67 and 1.06 for office-based physicians, 0.68 and 0.94 for community health centers, and 0.89 and 1.22 for hospital outpatient facilities.

for case mix (J. Weiner et al, unpublished data, 1994). The study population was composed of patients who had one or more of six conditions or indications for health services; were continuously enrolled in the Medicaid program during 1988 and younger than 65 years; were not enrolled in Medicare; were enrolled in Aid to Families With Dependent Children, Supplemental Security Income, or general public assistance; had a usual source of care (USC) that was not a health maintenance organization (from which there were no claims forms); had submitted USC claims for at least 10 patients; and had treated patients whose total payment did not exceed twice the mean plus 2 SDs for the ambulatory care group (ACG) eligibility category. Drawing from the literature on continuity of care provided by a USC,⁵ we applied a previously used method⁶ to assign each patient to a USC based on the provider that rendered the majority of outpatient visits for the patient in 1988, as determined from review of claims data.

As part of the larger study (J. Weiner et al, unpublished data, 1994), variation in resource consumption, ie, combined payments for all inpatient and outpatient services, was characterized for all patients (not only those with six diagnoses) by accounting for two geographic areas within the state (either the Baltimore metropolitan area or the rural Eastern Shore), type of provider, and case mix (using the ACG classification method).^{7,8} First, the study population

was divided into 102 groups based on the 51 case-mix groups (ACGs) and the Medicaid eligibility groups; the mean total payments of patients in each of the 102 groups were then calculated. Second, a ratio of the observed value of total payments to the expected value (the mean for the ACG) of total payments for the year was calculated for each patient. Third, to assign these patients' providers to one of three cost levels (low, medium, or high), the mean of the observed-to-expected total-payment ratios for each provider's USC patients was calculated. Fourth, providers were stratified by type (office-based, CHC, or hospital) and then placed in order from lowest to highest according to the mean of their observed-to-expected ratios for total payments. Finally, within each type of provider, providers at the 30th percentile or below were designated as "low cost," those between the 30th and 70th percentiles were designated as "medium cost," and those at the 70th percentile or above were designated as "high cost."

Sampling for Quality-of-Care Review

In our chart reviews, we studied six conditions: otitis media (*International Classification of Diseases, Ninth Revision [ICD-9]*, code 881.0 or 382) in patients aged 3 years or younger; asthma (*ICD-9* code 493) in adults (aged 18 years or older); asthma in children (younger than 18 years); hypertension (*ICD-9* code

401) in adults (aged 18 years or older); diabetes (*ICD-9* code 250) in adults (aged 18 years or older); and well-child care (in recipients who had their second birthday during the first half of the study year). All 2-year-olds with the childhood conditions (otitis media or asthma) were also included in the review of well-child care. In addition, we assessed the quality of well-person care for all adults in the sample, combining those in the individual condition categories.

We used cluster sampling to select providers and their patients from the 27 213 patients who had at least one visit in the year for one of the six conditions (determined by claims data) and resided either in the Baltimore metropolitan area or on the Eastern Shore (for practicality in collecting data). The average number of visits made by patients with these conditions was 7.1 (asthma), 8.8 (diabetes), 7.6 (hypertension), 6.5 (otitis media), and 3.1 (well child). Three quarters of all patients had three or more visits in the year. An additional 13% had two visits, both of which were to the same provider. In 13% of instances, individuals had only one visit, which was assigned as the USC. Sampling patients from an equal number of providers from each of the cost levels would have resulted in the study of a larger number of patients with medium cost. Therefore, we oversampled both low-cost and high-cost providers to achieve a final sample of patients of approximately 40% low-cost providers, 20% medium-cost providers, and 40% high-cost providers.

For both hospitals and CHCs, we drew a random sample of patients in each provider type and cost level. Thus, the number of patients selected at hospitals or CHCs was proportional to the number of patients with that USC in the cost level. Office-based physicians were divided into those with small Medicaid caseloads (the 85th percentile or below for number of patients) and larger Medicaid caseloads (above the 85th percentile for number of patients). The first 10 patients for physicians with small Medicaid caseloads and the first 20 patients for physicians with large caseloads were selected for review. The final distribution of 2024 patients within each cost level was approximately 90% urban and 10% rural. The Table shows the sample sizes in each study category.

Patients treated by each selected provider were then arrayed randomly by condition in rotating order (ie, otitis media, asthma, diabetes, hypertension, well child, otitis media, and so on), so that the patients whose charts were selected randomly for review at each provider would contain as diverse a mix of the six conditions as possible. If any patient had

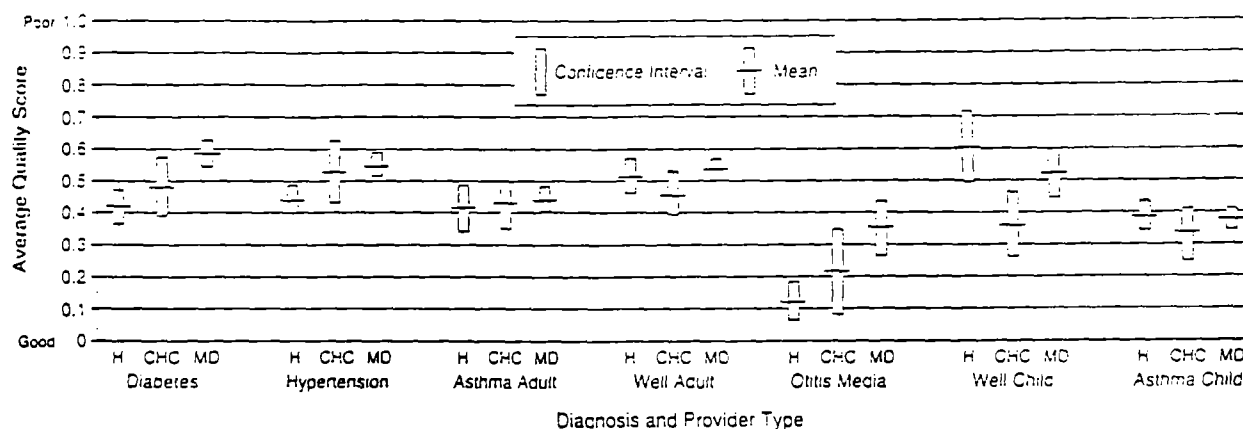


Figure 1.—Technical quality, by provider type. H indicates hospitals; CHC, community health centers; MD, office-based physicians.

more than one condition, one condition was randomly chosen.

Data Collection

Professional nurse reviewers employed by the federally designated peer review organization in Maryland, who were under contract to the state Medicaid administration, were trained by study investigators and research staff to conduct chart reviews, using a standardized instrument, in providers' offices. Review forms contained the diagnosis and all dates of visits obtained from claims forms. Tests of interrater reliability in abstracting chart data indicated agreement for 85% for all data elements.

Quality-of-Care Indicators

Indicators of quality of care originally were derived from published literature and then reviewed by a panel of national experts in quality-of-care assessment. These indicators consisted of both generic (applicable to all patients regardless of condition) and condition-specific aspects of care. Condition-specific indicators were divided into four categories: access to primary care, technical quality, appropriateness of care, and outcomes of care (available for diabetes only). Access indicators (for all except well-adult care) included visits for emergency services or hospitalizations for the condition under examination (obtained from claims records), under the assumption that provision of accessible primary care should minimize emergency visits and hospitalizations. Technical quality indicators for all seven indicator conditions reflected current standards for procedures directed at medical diagnosis, treatment, and monitoring of patients with the particular diagnosis. Appropriateness measures were those not indicated for patients with asthma, eg, chest roentgenogram. Generic indicators included no or incomplete problem list;

no medication list; no recognition of visits to other providers; documentation of psychosocial problems (on the assumption that a finite proportion of patients should have a diagnosis of a psychosocial problem within 1 year if care is adequate); and rates of hospitalization for ambulatory-sensitive conditions.⁹ Both of the latter two generic indicators were obtained from claims records.

The indicators used for evaluation of quality of care in asthma were access, technical quality, and appropriateness. Access indicators included hospitalization within abstract year with asthma as primary diagnosis; at least one emergency department visit for asthma within abstract year; and consecutive emergency department visits for asthma in abstract year. Technical quality indicators were chronic oral steroid use within abstract year. Of those patients taking chronic oral steroids, no follow-up visit occurred in 2 months. For a child taking oral steroids, no updated growth chart was in the record. Other technical quality indicators were symptomatic patients on theophylline without theophylline measured; patients on theophylline only; no flu vaccination within abstract year or no pneumococcal vaccination documented ever; tranquilizers/sedatives or β -blockers prescribed during abstract year; visit for asthma with no follow-up visit scheduled within 6 months; change in treatment with no follow-up visit scheduled within 3 weeks; and no chest examination during abstract year. Appropriateness indicators included chest roentgenogram given for patient without fever or abnormal chest signs. A list of the measures for other conditions is available on request from the National Auxiliary Publications Service (NAPS).

The number of indicators for each of the conditions varied from six (for otitis media) to 19 (for diabetes). A score of 1

was assigned to each if the criterion for poor quality was met.

A total score for each indicator category (access, technical quality, appropriateness, and outcomes) was obtained by adding the scores for the pertinent indicators. Each patient's final score was an average of the scores for the categories, ie, all categories were weighted equally regardless of the number of indicators. Then the average (mean) scores for all patients in each provider type or cost level was calculated for each condition. These scores reflect the average percentage of indicators that were not met for the patients in each group. That is, higher scores indicate poorer quality of care. The reason for this type of scoring is that judgments about poor quality were more straightforward than judgments of good quality.

Statistical Analysis

Analyses were conducted with the patient as the unit of analysis. Means and confidence intervals (CIs) were generated. We compared CIs based on a simple random-sample design with those designs that took into account correlations among patients having the same provider. Except for the generic indicators, there were no differences in CIs based on the two methods, so we present the former.

RESULTS

Record Recovery, Eligibility, and Review Completion Rates

No provider refused to participate in the review. Overall, 92.9% of the requested charts were provided. Of these, 88.7% were eligible for review. Review completion rates (considering both charts found and eligibility of charts for review) ranged from 80% for patients with hypertension to 88.4% for patients with asthma. In all cases, between 87% and 95% of charts were found when facilities were arrayed by type and cost

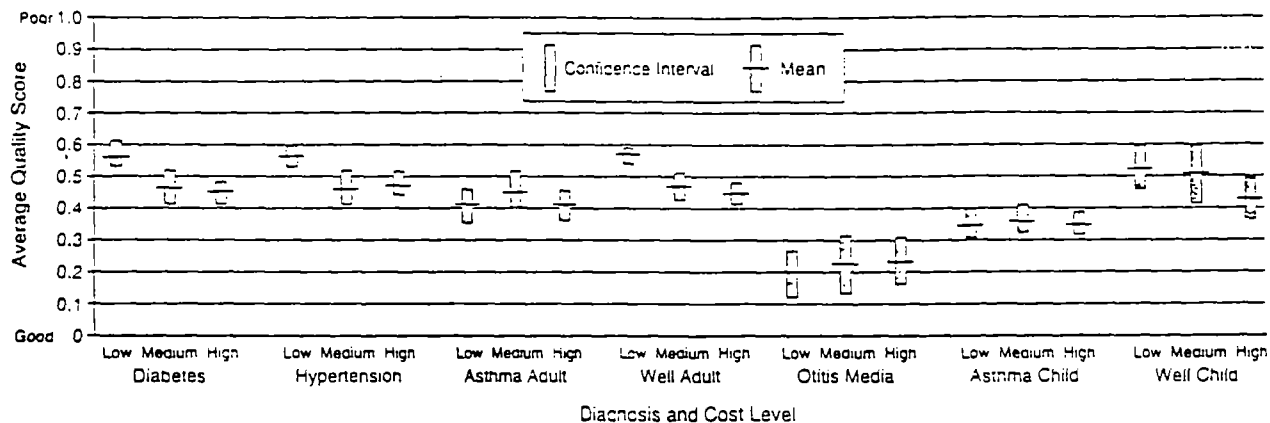


Figure 2.—Technical quality, variation by cost level.

and between 82% and 94% of the identified charts were found eligible for review. Hospital charts were less likely to be eligible for review (82% to 86%) than CHC charts (92% to 95%) and office-based physician charts (91% to 92%), primarily because they did not contain the indicated diagnosis.

Indicators of Technical Quality

Patients of office-based providers had statistically significantly higher scores (ie, poorer technical quality) than did hospitals for three of the seven conditions: diabetes, hypertension, and otitis media (Figure 1). In contrast, patients of CHCs had statistically significantly lower (ie, better) scores than hospitals for well-child care. There was no consistent relationship between technical quality and provider cost level, although patients of low-cost providers had the highest (worst) scores in diabetes, hypertension, and well-adult care; this was the case across cost levels for all provider types (Figure 2).

Indicators of Access, Appropriateness, and Outcome

Figure 3 shows the average scores by provider type for access, appropriateness, and outcomes. Patients of hospital clinics had statistically significantly higher (worse) scores on access for three of the five diagnoses and significantly worse scores than CHCs for a fourth. Patients of hospital clinics had higher (worse) scores for appropriateness; the difference between patients of hospital clinics and patients in physician offices was statistically significant for adults. There were no marked differences in these indicators by the cost level of the provider for any of the conditions, although scores were almost always higher (poorer) for patients of hospital clinics for each condition at every cost level except for patients of low-cost and me-

dium-cost hospitals for hypertension (data not shown).

Combined Quality Indicators for Each Condition by Type of Provider and Cost Level

Patients of hospital clinics had statistically significantly higher (worse) mean scores than patients of either CHCs or office-based practices for asthma in children and adults (data not shown).

There was no relationship between the cost level of the provider and overall quality score. That is, low-cost providers performed as well as both medium-cost and high-cost providers.

Generic Indicators

Figure 4 shows that records of patients of CHCs were significantly more likely and that records of patients of office-based physicians were less likely to have problem lists. Visits made elsewhere were less likely to be documented in the medical records of patients of hospital clinics. There were no differences across provider sites in the percentage of patients with psychosocial diagnoses, the percentage of patients who were hospitalized during the year with an ambulatory care-sensitive condition, or scores for the generic measures of quality by cost level. However, medium-cost CHCs scored better than other CHCs and low-cost office-based physicians scored better than other office-based physicians for four of the five generic measures.

Consistency Across All Indicators

In all, there were 16 diagnosis and well-person comparisons for various aspects of quality of care for the indicator conditions and five generic comparisons. Although the differences were not always statistically significant, patients of medium-cost CHCs had the lowest (best) scores for seven indicators and

the second lowest score for an additional four indicators, whereas patients of low-cost hospitals had the worst scores for eight indicators. When the different types of quality measures were combined by condition, medium-cost CHCs had the best scores for five of the seven indicators and second best for one additional indicator. As noted herein, medium-cost CHCs had the best scores for four of the five generic measures; they also had the second best score for the remaining one. There were no consistent trends for worst scores by cost level for the generic indicators.

COMMENT

This study had several distinguishing and innovative features. First, we identified and characterized a large and diverse regional population of providers using claims data and reviewed their ambulatory care records for patients with several conditions. Access to providers' records was facilitated by a cooperative arrangement between investigators and policymakers in state government. Development of mechanisms for review of quality of care in outpatient settings was a priority for the peer review organization and for the state health department, which has the authority to review providers' records of patients for whom the state provides payment. This arrangement ensured 100% compliance of practitioners and facilities.

Second, claims data served to identify and categorize patients by their USC and by the costs incurred for their care, as well as to identify their diagnoses and visits. This information permitted us to focus medical record reviews for quality of care. Third, quality of care was conceptualized broadly to include various aspects of care and to ascertain its characteristics in both adults and children for a spectrum including acute condi-

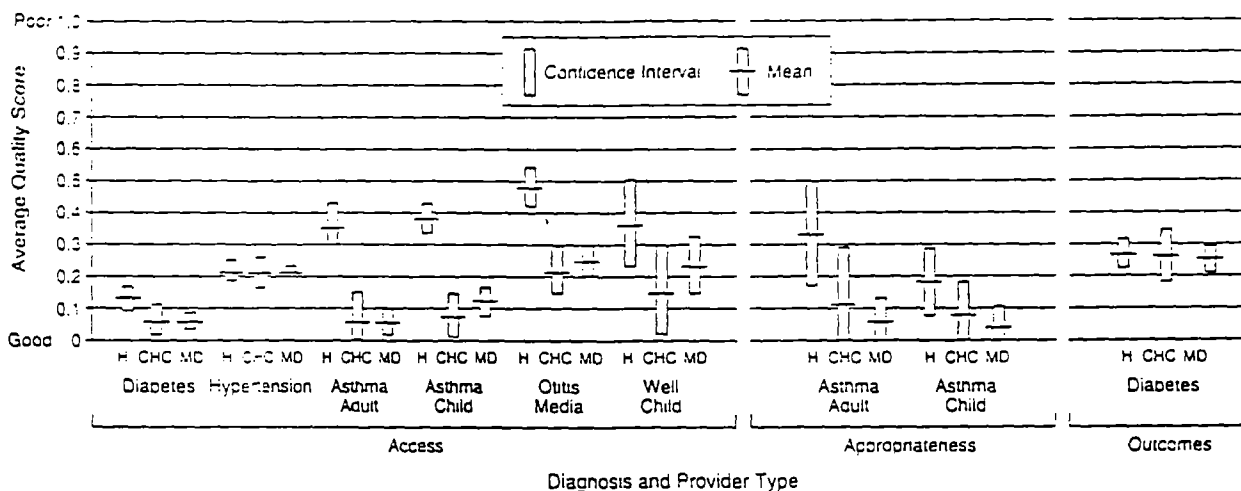


Figure 3.—Indicators of access, appropriateness, and outcomes by provider type. H indicates hospitals; CHC, community health centers; MD, office-based physicians.

tions, chronic conditions, and preventive (well-person) care, as well as measures that are generic to the process of providing care regardless of the condition. Fourth, we also applied a validated measure of case mix to control for the likelihood that variations in cost are associated with differences in case mix of patients cared for by different types of providers. Moreover, since prior studies have found no consistency in quality of care across providers or types of conditions,¹⁰ we focused primarily on the patterns of association and their consistency across the various quality assessments rather than on individual conditions, because it is overall quality of care rather than quality of care for particular conditions that is likely to be the basis for decisions concerning the choice of a primary care provider.

We found few consistent variations in quality of care across different types of providers and across providers who differ in the amount of resources they consume in caring for patients, after adjustment for case mix. The only consistent differences across the various categories of quality of care were the generally better performance of medium-cost CHCs, although this finding must be tempered by the small number of such settings.

The lack of relationship between quality and costs has important implications for health system reform and managed care organizations. Facilities that provide services at lower costs can achieve adequate quality as often as higher-cost facilities. In this study, facilities were characterized as low, medium, or high cost in comparison with facilities of their own type. Since services provided in hospitals generally are more costly, low-cost hospitals were undoubtedly more

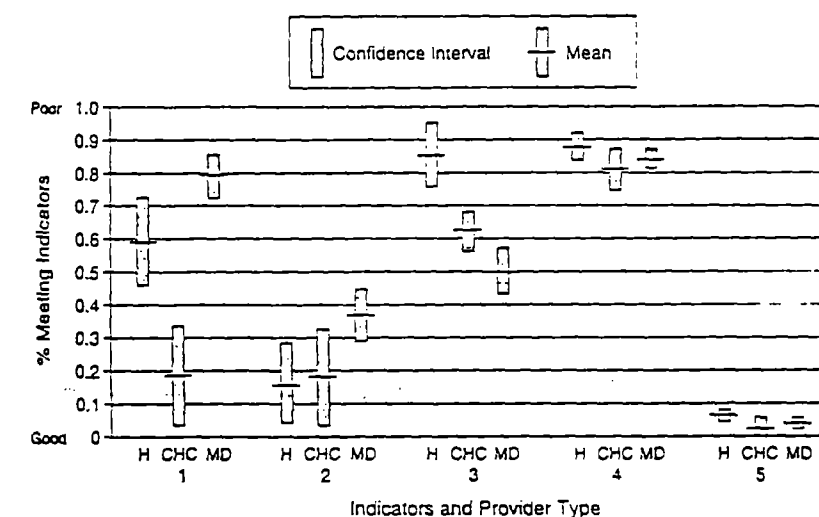


Figure 4.—Generic indicators by provider type. H indicates hospitals; CHC, community health centers; MD, office-based physicians. Indicators: 1=no problem list, 2=no medication list, 3=visits elsewhere documented, 4=no psychosocial diagnosis, and 5=ambulatory-sensitive admissions.

costly than low-cost CHCs or office-based physicians. The same would be the case for medium-cost and high-cost hospitals. The findings, therefore, are all the more notable, since hospital care was not found to be of higher overall quality than care in the other two types of facilities. In fact, quality as assessed by measures of access to services was less adequate in hospitals. That is, the findings regarding the absence of relationship between quality and costs would be even more striking if cost alone, regardless of type of facility, was considered.

The finding of generally higher quality in moderate-cost CHCs is interesting and deserves further study. This finding may be due to differences in workforce training or clinical manage-

ment practices such as quality assurance activities. Further studies should be undertaken to understand the factors that influence both the choice of resources and the quality of care in these facilities. Similarly, the relatively good scores for technical quality in high-cost hospitals may be a result of a propensity to order tests and procedures; the more they do, the greater likelihood of performing tests and procedures considered to be indicative of high quality.

This study also suggests that periodic assessments of quality of care may be feasible under health system reform, in which consumer choice could be enhanced with information on performance of different health plans. Review of records in ambulatory care can be performed by personnel from peer review

organizations; with appropriate training, nurse reviewers can apply explicit criteria in their examination of medical records in different types of settings. Information from claims records can target reviews to the wide variety of types of clinical entities encountered in ambulatory care.

There are several limitations of the study design. In some instances, the quality indicators were confounded with the assignment of the USC. Hospitals, in general, did not specify the particular physician or outpatient unit seeing the patient in their billing data. As a result, patients whose USC was an emergency department, and who regularly went there, would have been considered as having poor quality of care for access to primary care. This consideration may have influenced the finding that patients with a hospital as their USC had poorer access to care for their asthma, since the indicators for this measure included emergency department visits for this condition. Since no third-party payer is likely to consider an emergency department as a source of primary care, this limitation is not considered serious.

Although the ACG method is a well-validated method of adjusting resource use for case mix and separately accounts for complications of disease in characterizing morbidity burdens, the method may not capture all aspects of severity of disease.

Other possible limitations in the data relate to the accuracy of information in medical records. Poorer technical quality scores among office-based providers may be related to record keeping. Among office-based physicians, reviewers' ratings indicated generally poorer legibility among those with poorer technical quality. If physicians in office-based practice are less likely to document aspects of patient care because of greater familiarity with patients, then their poorer technical quality may be artifact. One other aspect of this large study examined the extent of agreement between medical records and claims forms

for both diagnoses and dates of visits (D. Steinwachs et al, unpublished data, 1994). Another aspect assessed the quality of care as judged solely from claims forms information (N. Powe et al, unpublished data, 1994). The former study (D. Steinwachs et al, unpublished data, 1994) found low-cost providers more likely to have failed to bill for visits that took place (as reflected in medical record notes). Although the magnitude of this underbilling was relatively small in relationship to the other billed costs, the effect may have led to miscategorization of some providers as low resource users when, if they had billed, they might have been in a higher category.

Although access to medical records was greatly facilitated, this did not ensure an easy review process. Records typically were not standardized across providers, and for hospital providers, portions were sometimes kept in more than one location. Furthermore, some providers (eg, hospitals) transfer hard copies of medical records to other media such as microfiche, which makes reviews logistically difficult.

In this study, the USC was a proxy for the actual source of primary care in this patient population. From a policy viewpoint, there is interest in the extent to which patients with a source of primary care, which provides longitudinal, first-contact, comprehensive, and coordinated care,² have better quality of care at lower cost than patients seen at a variety of places for their health care needs. Information to characterize patients by their designated association with a source of primary care generally is not available. Subsequent studies of the quality of care provided by primary care sources will be facilitated by the advent of managed care arrangements in which patients must designate a source of primary care, which subsequently becomes part of routine data-reporting systems.

Although we included a spectrum of common conditions (including acute, chronic, and preventive care) in our

analysis of quality of care, there are many other conditions that are managed by providers of primary care. Furthermore, our population was limited to patients covered by a state Medicaid program, and the findings may not be generalizable to other populations.

In summary, this regional, population-based study suggests that the quality of primary care in health care facilities is not associated with overall resource use by those facilities, regardless of their type. However, certain aspects of the quality of care appear to be better in particular types of facilities than in others. Approaches to managed care, including those undertaken by state Medicaid agencies, may find such information useful in their selection and monitoring of participating health care providers.

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