Use and Costs Under the Iowa Capitation Drug Program

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This article evaluates changes in the use of drug services and the corresponding costs when the conventional fee-for-service system for reimbursement of pharmacists under Medicaid is replaced by a capitation system. The fee-for-service system usually covers ingredient costs plus a fixed professional dispensing fee. The capitation system provided a cash payment (which varied by aid category and season of the year) per Medicaid eligible the first of each month. We examined drug use and costs in two experimental rural counties during a 1-year preperiod in which the fee-for-service form of reimbursement was employed, as well as a 2-year postperiod in which the capitation system was used. We compared the results with use and cost patterns in two other rural counties which remained on the fee-for-service system during the same 3-year period.

Drug use was similar among control and experimental counties with the exception of nursing home patients; use in this category decreased under capitation and increased under fee-for-service.

Using three measures of drug cost: 1) average cost of a day's drug therapy; 2) average drug costs per recipient; and 3) average Medicaid expenditures for drug services per recipient, we observed significant savings under the capitation reimbursement system as compared to the fee-for-service system. We attributed savings under capitation to shifts in prescribing and dispensing behavior, as well as changes in use by nursing home patients. Based upon these findings, the total savings resulting from implementing capitation would be approximately 16 percent when compared to fee-for-service reimbursement.

Introduction

The enthusiasm for a national health insurance plan continues to flourish among various interest groups in this country at the same time fiscal conservatism is on the rise. Furthermore, many of the proponents of national health insurance readily admit that the present government health programs, especially Medicaid, are fraught with problems of inefficiencies and excess costs (Kennedy, E., 1977; Nader, R., 1977; and Califano, J., 1977). The Medicaid drug program is no exception and has been involved in considerable controversy (National Health Insurance Reports, 1976; Weekly Pharmacy Reports, 1975; and Davis, K., 1976). Currently, all but two States[1] offer some type of prescribed drug benefits to Medicaid eligibles (National Pharmaceutical Council, Inc., 1980). These benefits have been made available to those who would otherwise be unable to afford such services. However, the cost of the Medicaid drug program has escalated dramatically over the past 10 years. In addition, problems have arisen regarding the level of the fees paid to pharmacists, and delays in reimbursement.

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[1]A third state, Arizona, does not participate in the Medicaid program.

Costs

Combined Federal and State expenditures for the entire Medicaid program increased from approximately $3.5 billion in 1968, to over $18 billion in 1978 (National Pharmaceutical Council, Inc., 1980). Overall, prescribed drugs account for approximately 6 percent of total Medicaid expenditures. Although a sizeable share of the increase in drug expenditures is attributed to a sharp increase in the number of eligible Medicaid recipients, a significant portion of this rise in expenditures is the result of *per capita* increases in the use of prescription drug services (U.S. House of Representatives, 1976). Since pharmacists receive payment for the cost of ingredients as well as a professional fee for each prescription filled, unnecessary use of drugs by Medicaid patients can lead to profit maximization for pharmacists.

Evidence exists that pharmacists may be able to save the Medicaid program money, but in doing so would receive no economic benefit (Table 1). In fact, economizing to benefit the Medicaid drug program may, in some instances, decrease pharmacist profits. Pharmacists who actively participate in drug product selection, and physician and patient counseling, and who monitor patient drug profiles may save taxpayer dollars, but at their own expense. This paradox is discussed at length in a report on the future of pharmacy, commissioned by the American Association of Colleges of Pharmacy (American Association of Colleges of Pharmacy, 1975):

> "One can imagine a situation in which a pharmacist discovers from the patient drug record that the prescription presented is identical to that given to the patient by another physician a few days before. If the pharmacist calls the second physician to report the duplicate prescription, it is at the expense of the opportunity to sell the second prescription. Or if a pharmacist notices that a patient to whom he is delivering a prescription is purchasing an over-the-counter drug which will likely produce an adverse reaction when taken in conjunction with the prescription, he undoubtedly should advise the patient not to make the purchase. However, such advice is given at the expense of a prospective sale and profit to the pharmacist. Not only is there no economic incentive to communicate with the patient, there is the reverse incentive *not* to communicate."

Professional Fees

Typically, the State Medicaid commission sets a standard, fixed, professional fee for the pharmacist which is added to the ingredient cost of a prescription. This method of reimbursement is based on the fee-for-service concept. The amount of the fee and the method by which "acquisition" (or ingredient) costs are determined are subject to many complaints from pharmacists (U.S. House of Representatives, 1978).

An additional problem with the Medicaid drug program is the large difference in fees among States. For example, the dispensing fee in Kentucky has been $2.35 while, at the same time, in California it has been $3.60 (National Pharmaceutical Council, Inc., 1980). This variation in fees could probably not be explained simply by differences in operating costs.

Furthermore, the fixed fee ignores differences in professional services among pharmacies as well as variation in costs due to location differences (inner-city, suburban, and rural). Attempts by pharmacists to increase their Medicaid fees through collective negotiation have been ruled to be in violation of the Sherman Anti-Trust Act (U.S. House of Representatives. . . , 1978). Thus, the pharmacist has the choice of either accepting the State-determined dispensing fee or not participating in the Medicaid program. The latter choice may have significant ethical ramifications, especially in rural areas where another provider of drug services may not be available to the patient.

Reimbursement

After dispensing a prescription to a Medicaid recipient, the pharmacist submits a claim to the State Medicaid program or its designated fiscal intermediary. Assuming the claim is in order, the pharmacist must usually wait from two weeks to several months for payment (U.S. House of Representatives, 1978). Although the pharmacist must pay to replace these drugs, he receives no interest to compensate for any delay in his reimbursement. In extreme instances, pharmacists have had to arrange short-term loans to continue business (U.S. House of Representatives, 1978).

Since categorical indigence is determined monthly in most Medicaid programs, the pharmacist is often faced with the problem of claims being disallowed because the consumer is no longer eligible for benefits. Likewise, claims are disallowed whenever prescriptions are dispensed for drugs which are not covered by the Medicaid program. In these instances, the pharmacist either incurs the loss or attempts to recover the cost from the patient.

Iowa Capitation Program

The Iowa Medicaid drug program, in an attempt to deal with the problems of escalating costs and delays in reimbursement, established an experimental program using the capitation method for pharmacist remuneration. The objective was to provide optimal patient care while reducing drug and administrative costs. The capitation system provided cash payments to pharmacists at the first of each month for each Medicaid eligible who selected that pharmacy. The rate varied by aid category (Table 2), inflationary trends, and season of the year.

Under the capitation system of reimbursement for pharmacy services, Medicaid eligibles selected a pharmacy from which they wished to receive all of their

TABLE 1
Medicaid Drug Program
Potential Effect of Pharmacist Interventions

Current Practice		Potential Pharmacist Intervention	Possible Impact on Pharmacist's Profits Under Fee-for-Service
Description	Impact on Medicaid Costs		
1. Patients visiting multiple physicians and pharmacies to obtain multiple prescriptions for the same drug.[1]	*Increased Costs:* Medicaid is charged more than once for the same service.	Restricting patients to one pharmacy for a given time period.	Decrease
2. Patients receiving high priced brand name drugs when lower cost generic equivalents are available.[2]	*Increased Costs*: Due to the differences in drug product costs.	Dispensing lower cost generic equivalents when there is no difference in bioequivalence.	No Change
3. Patients receiving legend drugs when less expensive over-the-counter drugs would suffice.[3]	*Increased Costs*: Due to the differences in drug product costs.	Requesting the physician's permission to substitute the OTC drug.	Decrease
4. Patients receiving expensive legend drugs when less expensive drugs within the therapeutic category would suffice.[4]	*Increased Costs*: Due to the differences in drug product costs.	Requesting the physician's permission to substitute a less expensive drug within the therapeutic category.	No Change
5. Dispensing maintenance drugs in small quantities.	*Increased Costs*: Professional fee paid more often.	Requesting the physician's permission to dispense maintenance drug prescriptions in larger quantities.	Decrease
6. Dispensing prescriptions with less than optimum dosage regimens.[5]	*Increased Costs*: More physician visits and prescription drugs needed to properly treat a given illness.	Suggesting to physicians that a more optimum dosage regimen be used.	Decrease
7. Dispensing prescriptions without properly counseling the patient on compliance.[6]	*Increased Costs*: More physician visits, and prescription drugs needed to properly treat a given illness.	Counseling patients.	Decrease
8. Dispensing a combination of drugs which may adversely interact.[7]	*Increased Costs*: More physician visits, prescription drugs and possible hospitalization needed to properly treat a given illness.	Monitoring patient drug profiles for interactions and advising physicians accordingly.	Decrease

[1]Maronde, RF; Burks, D, II; Lee, PV, *et al.*: Physician Prescribing Practices: A Computer Based Study, *American Journal of Hospital Pharmacy*, 26:566-73, 1969.

[2]Goldberg, T; Aldridge, GW; DeVito; CA, *et al.*: Impact of Drug Substitution Legislation: A Report of the First Year's Experience, *Journal of the American Pharmaceutical Association*, NS17 (No. 4):216-226, 1977.

[3]Miller, RR, *et al.*: Propoxyphene Hydrochloride, A Critical Review, *J.A.M.A.*, 213:996-1006, 1970.

[4]Barza, M; and Schiefe, R: Antimicrobial Spectrum, Pharmacology and Therapeutic Use of Antibiotics, Part I: Tetracyclines, *American Journal of Hospital Pharmacy*, 34:49-57, 1977.

[5]Palumbo, F; Knapp, DA; Brandon, BM; *et al.*: Detecting Prescribing Problems Through Drug Usage Review, *American Journal of Hospital Pharmacy*, 34:152-154, 1977.

[6]American Association of Colleges of Pharmacy: *Pharmacists for the Future*: The Report of the Study Commission on Pharmacy. Health Administration Press, Ann Arbor MI, 1975, p. 56.

[7]*Ibid*, p. 44.

prescription services for the upcoming month. If dissatisfied, the enrollee had the option of selecting another pharmacy at the start of the next month. At the beginning of the month, each pharmacy received a capitation payment and a list of those Medicaid eligibles who selected that pharmacy.[2] Thus the pharmacist, by accepting the capitation payment, agreed to provide all necessary drug services to those people whose names appeared on his list.

TABLE 2
Approximations of Typical Monthly Capitation Rates

Patient Aid Category	Rate
Aid to Dependent Children	$ 2.50
Supplemental Security Income	$14.00
Intermediate Care Facilities	$30.00

The overall objective of our study was to evaluate the effects of a financing change on: prescribing and dispensing behavior; drug use and costs; and Medicaid administrative costs. Specifically, this report assesses the effect of capitation on the use and costs of drug services.

Research Design

The evaluation of the Iowa Capitation program involved a before/after, experimental/control design (Table 3). In essence, drug use and costs in two rural experimental counties were examined during a one year *pre* period in which the fee-for-service form of reimbursement was employed, as well as a two year *post* period in which capitation was used instead of fee-for-service reimbursement. These data were compared to similar observations made in two rural control counties which remained on fee-for-service reimbursement over the same three year period.

TABLE 3
Experimental Design

	Pre Period	Post Period	
	Study Year		
	Year 1	Year 2	Year 3
Control	F[1]	F	F
Experimental	F	C[2]	C

[1]F denotes fee-for-service.
[2]C denotes capitation.

We selected and matched the experimental and control counties on the basis of their demographic characteristics, such as age and sex distribution, as well as pharmacist/population and primary care physician/population ratios[3] (Table 4). The information in Table 4 shows that the population characteristics of the State of Iowa approximate those of the nation in terms of age and sex. Furthermore, the distribution of physicians, pharmacists and pharmacies in Iowa, in terms of provider (or facility) population ratios, approximates those ratios for the United States. Iowa ranks 25th among states in total area and population size, while it ranks 30th in population density (U.S. Census, 1970).

No chain pharmacies were present in either the experimental or control counties, and none of the pharmacies had a majority of its patients in the Medicaid category.

Rationale

Under the current fee-for-service system in the Iowa Medicaid program, the pharmacist receives payment for the cost of ingredients as well as a professional fee for each prescription filled. However, under capitation, a pharmacist's revenue was a function of the number of Medicaid eligibles on his roll, not the number of prescriptions he dispensed. As a consequence, we anticipated that, under capitation, pharmacists would alter their dispensing behavior in a number of ways, and influence physicians' prescribing behavior to keep prescription dispensing costs low. These changes may be manifested by 1) shifting to lower cost generic equivalents; 2) changing the quantities of drugs dispensed per prescription, and monitoring the drug dosage regimen; 3) changing the type of drugs dispensed within a therapeutic category; 4) switching to over-the-counter (OTC) drugs; and 5) intercepting drug interactions. Most of these modifications in drug usage would be made after consultation between the pharmacist and the physician. Our rationale and findings regarding the hypothesized changes in prescribing and dispensing behavior were reported earlier (Yesalis, *et al*, 1980; Helling, *et al*, 1981; and Norwood, *et al*, in press) and are summarized below.

- *Shifting to lower cost generic equivalents*—Changes in generic substitution laws in certain States (such as Iowa) permit pharmacists to substitute lower cost generically equivalent drugs. Two conditions are usually associated with this type of law: 1) the generically equivalent product must cost less; and 2) the pharmacist must pass all of the savings on to the consumer or third-party payer.[4] The Iowa law specifies that for Medicaid patients the pharmacist must substitute

[2]People selected a pharmacy on a month-by-month basis because Medicaid eligibility is determined monthly.

[3]This includes general practitioners, osteopaths, internists, pediatricians, and obstetricians/gynecologists.

[4]Although some States have recently altered their laws to permit pharmacists to share in the savings when a generic equivalent is dispensed, this revision would not apply to prescriptions paid by the Medicaid program.

TABLE 4
Demographic and Provider Characteristics of Study Population, State of Iowa, and the U.S.

	Median[1] Age	%[1] Male Population	Number[2] of Medicaid Recipients per 1,000 Population	Community Pharmacists per 100,000 Population	Pharmacies per 100,000 Population	General Care Physicians per 100,000 Population
Control Counties	32.5	48.9	43	55.5[3]	26.0	53.4[3]
Experimental Counties	31.0	49.3	42	45.8[3]	26.8	57.2[3]
State of Iowa	28.8	48.6	49	41.8[4]	25.0	45.1[4]
United States	28.0	48.7	111	53.5[4]	24.5	57.4[4]

[1]U.S. Census 1970
[2]Iowa State Department of Social Services
[3]Iowa Health Manpower Plan, 1975
[4]Health Resources Statistics, 1974, U.S. Department of HEW (1972-1973 Data)

generic equivalents if they are "on hand," unless the physician has specifically indicated otherwise. The "on hand" component of many of these laws, however, serves as a major loophole, since there appears to be no reasonable way to police pharmacies to determine if they have in inventory a generic equivalent of a lower cost than the prescribed drug.[5] The pharmacist is under no obligation to stock more than one brand of a multiple source drug. Under the fee-for-service reimbursement system, the pharmacist has no economic incentive to either seek alternative suppliers of generic products or dispense those lower-cost generic equivalents. In contrast, a capitation system of reimbursement will reward the pharmacist who can minimize his prescription ingredient costs, since his profit is inversely related to the level of those costs.

A six-fold increase in generic substitution under capitation was previously reported (Yesalis, *et al*, 1980). Furthermore, the findings illustrated a highly significant increase in the dollar savings per generic substitution under capitation. Using explicit criteria, the authors noted no substantial differences in the appropriateness of generic substitution between the two financing schemes (Yesalis, *et al*, 1980).

- *Changing the quantities of drugs dispensed per prescription, and monitoring the drug dosage regimen*—A capitation system reimburses the pharmacist for the number of patients on his roster rather than for the number of prescriptions dispensed. Therefore, one would anticipate that pharmacists would attempt to minimize refills by encouraging physicians to write prescriptions for larger quantities when maintenance drugs are involved. With maintenance drugs, however, the pharmacist must also be sure that the patient will continue to select his pharmacy each month. If the Medicaid recipient switches pharmacies after obtaining a 45-day supply of medication, the pharmacist will not be reimbursed for 30 percent (15 days' worth) of the drug costs. In the case of non-maintenance drugs, the pharmacist might decrease the quantity prescribed when such a decrease has a neutral or positive effect on the patient's therapy.

The present system of reimbursement provides little motivation for the pharmacist to monitor dosage regimens for variations other than harmful overdosages. Underdosages, especially of antibiotics, might result in the need for further drug therapy, which actually increases the pharmacist's revenue. Under capitation, however, we anticipated that the pharmacist would monitor dosage directions more closely and encourage physicians to correct underdosages as well as overdosages. If the pharmacist dispenses drugs with inappropriate dosage regimens, this practice may lead to patients remaining ill longer, thereby increasing overall drug use. In a capitation financing system, such increases in overall use would decrease the pharmacist's potential economic gain.

In the capitation experiment, the pharmacists made a significant number of changes in the quantities of ingredients so that the quantities dispensed were different from those prescribed. However, the incidence of such modifications to prescriptions was small and the reader is cautioned against drawing broad conclusions. We evaluated changes in days' supply of prescription ingredients over the study period and concluded that significant increases occurred in the average days' supply for maintenance drugs dispensed under the capitation reimbursement scheme. We then compared appropriateness of the quantities and dosages of medications dispensed for prescriptions for the capitation and fee-for-service pharmacies during the study period and found no significant differences. Thus, it was determined that although capitation was associated with increases in the average days' supply of ingredients dispensed for maintenance prescriptions, such changes did not adversely affect the quality of drug therapy, as measured by our criteria (Helling, *et al*, 1981).

[5]In those instances where Maximum Allowable Cost regulations are in effect, this loophole may not apply.

- *Changing the type of drugs dispensed within a therapeutic category*—Another means by which costs per prescription may be lowered is through changes in the type of drugs used within a therapeutic category, such as a shift toward Achromycin V® instead of Vibramycin® . In certain instances, changes in drug type can be more effective in lowering drug costs than simple generic substitution. Accordingly, one may anticipate that the astute pharmacist, working in a capitation system, would consult with the physician regarding the instances where such shifts may be feasible.

  Each of the 15 most frequently used therapeutic categories of drugs, including all the antibiotics, were analyzed during the experiment on the basis of changes in the average cost of a day's therapy over time. We found some cost effective changes in the market shares of individual drug products within specific therapeutic categories, such as the penicillins (Norwood, *et al*, in press).

  The data indicate that pharmacists under capitation became less active in switching drugs within therapeutic categories. In addition, the small numbers of switches which did occur did not significantly reduce either the costs or quality of drug therapy. Perhaps the poor performance by pharmacists in this area was due to a lack of knowledge of the relationship between such activity and a pharmacist's potential economic reward (Norwood, *et al*, in press).

- *Switching to OTC drugs*—Many Medicaid programs cover prescription drugs only, while the patient pays for nonprescription drugs from personal funds. The Iowa Medicaid drug program has a policy of not reimbursing pharmacists for dispensing OTC drug products, with the exception of insulin. Thus, one would anticipate a minimal amount of usage of OTC. However, under capitation, pharmacists would have the economic incentive to switch patients from prescription drugs to nonprescription drugs, where appropriate, if the physician is in agreement. This is due primarily to the lower costs, on the average, of nonprescription drugs which may serve as effective alternatives. Pharmacists were told they could not charge the Medicaid patient for OTC drugs under these circumstances.

  Although we observed significant increases during the study in the proportion of OTC prescriptions under capitation, the absolute rates were still relatively small. We analyzed all prescriptions to determine when changes between the drug prescribed and the drug dispensed involved OTC drugs. Again, we observed small but statistically significant differences in the extent of OTC switching under capitation as opposed to fee-for-service. The appropriateness of OTC switches improved in the experimental pharmacies during the time period of the study. We are reluctant to make firm conclusions regarding these findings due to the small number of switches which occurred in the control counties. Instead, we feel relatively safe in stating that it appears that the quality of drug therapy related to the use of OTC drugs did not decline in the capitation pharmacies during the time of the study (Norwood, *et al*, in press). Although the incidence of OTC drugs use was quite low, the average amount of dollar savings realized when OTC drugs were substituted for prescription products was substantial (approximately $5 per substitution) (Norwood, *et al*, in press).

- *Intercepting drug interactions*—Since drug interactions probably increase the duration of illness, and therefore necessitate further consumption of prescription drugs, we anticipated that, with a capitation plan, pharmacists will work more diligently to intercept such interactions. Furthermore, their efforts in this capacity should be more effective, because under capitation pharmacists are more likely to have complete drug histories of their patients due to the "lock-in" feature.[6]

  Building upon previous work in the area, the investigators developed a methodology to estimate the incidence of potentially inappropriate concurrent drug combinations, as well as the incidence of therapeutic duplications among the 100 most frequently prescribed drug products. The data indicated that the incidence of drug-drug interactions or therapeutic duplication was the same under both financing schemes (Norwood, *et al*, in press).

Results and Discussion

Use

Three factors, although not mutually exclusive, influence the cost of drug services: 1) use levels; 2) physician pescribing behavior; and 3) pharmacist dispensing behavior. Changes in pharmacist dispensing and physician prescribing behavior have been discussed earlier. Increased use of lower cost generic and OTC drugs under capitation led to decreases in drug costs. The expanded use of lower cost drugs within the same therapeutic category (primarily penicillins) also resulted in lower drug costs. Finally, under capitation, the increases in the average number of days of drug therapy per prescription for maintenance drugs led to decreased expenditures for professional services (Helling, *et al*, 1981).

[6]The capitation program stipulated that patients patronize only one pharmacy during a given month.

Tables 5 and 6 present the levels of *per capita* drug use. The only significant difference regarding drug use between fee-for-service and capitation reimbursement occurred in the intermediate care facility (ICF) aid category: the experimental ICF group experienced decreases in *per capita* use over the study years, whereas the levels of use of the control ICF group increased over time. Several researchers have noted that drugs are often used excessively in nursing homes (Kidder, 1978; and Cheung, 1975). Thus, the decrease in ICF drug use under capitation was not surprising.

TABLE 5
Average Number of Prescriptions per Recipient by Aid Category in Control and Experimental Counties Over Time

	Study Year		
	1	2	3
Control			
ADC	1.95	1.88	1.91
SSI	3.09	3.22	3.35
ICF	2.85	3.59	4.33
Experimental			
ADC	2.02	1.98	2.06
SSI	3.49	3.50	3.40
ICF	4.92	3.80	4.01

NOTE: Numbers of prescriptions and recipients were calculated on a monthly basis and annualized.
NOTE: Univariate Factorial Analysis of Variance was conducted for each aid category. The only significant result was the type by year interaction in the ICF aid category ($F = 7.24$, $p = .0063$).

TABLE 6
Average Days' Therapy per Recipient by Aid Category in Control and Experimental Counties Over Time

	Study Year		
	1	2	3
Control			
ADC	30.71	28.54	31.27
SSI	85.01	90.39	94.37
ICF	77.35	99.95	116.69
Experimental			
ADC	31.13	42.06	36.42
SSI	94.51	110.15	99.72
ICF	129.20	139.95	144.88

NOTE: Definition of Average Days' Therapy per Recipient = (Average Number of Rx's per Recipient) x (Average Days' Therapy per Rx).
NOTE: No significant effects resulted from factorial analyses of variance completed separately within each aid category.

Costs

Tables 7 and 8 show the average cost of a day's therapy. We determined the cost of a day's drug therapy using estimated acquisition costs (EAC). While we observed increases in cost in the control counties, we noted either no change or decreases in drug costs under capitation, yielding highly significant differences between control and experimental counties. These results reflect changes in dispensing and prescribing behavior rather than changes in the use of drugs.

TABLE 7
Average Cost (EAC) of Ingredients for a Day's Therapy by Aid Category in Control and Experimental Counties Over Time

	Study Year		
	1	2	3
Control			
ADC	$.26	$.29	$.28
SSI	.15	.17	.18
ICF	.14	.16	.15
Experimental			
ADC	.27	.20	.26
SSI	.18	.16	.18
ICF	.17	.13	.15

NOTE: Univariate Factorial Analysis of Variance produced type by year interaction terms which were significant in all three aid categories: ADC ($F = 12.34$, $p = .0007$); SSI ($F = 7.03$, $p = .0070$); ICF ($F = 12.28$, $p = .0007$).

TABLE 8
Percent Change in the Average Cost (EAC) of Ingredients for a Day's Therapy by Aid Category in Control and Experimental Counties Over Time

	% Change by Study Year		
	1-2	2-3	1-3
Control			
ADC	+11.5	−3.4	+7.7
SSI	+13.3	+5.9	+20.0
ICF	+14.3	−6.2	+7.1
Experimental			
ADC	−25.9	+30.0	−3.7
SSI	−11.1	+12.5	0.0
ICF	−23.5	+15.4	−11.8

The effect of all three factors (use, quantity per prescription, and ingredient cost) are included when we examine average drug costs per recipient (Tables 9 and 10). Substantial savings appear to be associated with capitation reimbursement in the supplemental

security income (SSI) and the ICF aid categories. A comparison of Tables 5-9 for the three aid categories reveals that the savings per recipient experienced in the capitation counties resulted from a stabilization or decline in both ingredient costs and use in the ICF and SSI categories. In the ADC category, the savings in ingredient costs experienced under capitation were offset by increases in use.

TABLE 9
Average Drug Ingredient Cost (EAC) per Recipient by Aid Category in Control and Experimental Counties Over Time

	Study Year		
	1	2	3
Control			
ADC	$ 8.00	$ 8.28	$ 8.74
SSI	12.76	15.36	16.96
ICF	10.83	15.97	17.51
Experimental			
ADC	8.39	8.41	9.46
SSI	16.99	17.62	17.96
ICF	21.96	19.06	22.93

NOTE: Univariate Factorial Analysis of Variance produced a significant type by year interaction in the SSI aid category ($F = 5.45$, $p = .017$). Although the type by year interaction in the ICF category was not significant ($F = 3.30$, $p = .065$), the main effect for type was significant ($F = 19.18$, $p = .0005$).

Table 10 provides some insight into the effect of time on savings experienced under capitation. These data show that the majority of the savings are experienced during the first year, with smaller percent increases in addition to this base savings observed during the second year.[7] These data are consistent with learning theory in that we noted a large percent improvement of effort early in the learning process, followed by small increases at the margin, and stabilization thereafter.

The measure of cost used in Tables 9 and 10 includes only the cost of drug ingredients consumed and not the cost of professional pharmaceutical services which are normally covered through dispensing fees under fee-for-service or the monies remaining after payment for drug products under capitation. Furthermore, costs incurred by the Medicaid program for drug services provided to residents of the experimental and control counties outside of those counties are not included.

[7]For example, if the level of Medicaid expenditures under fee-for-service equals 100 and during the first year of capitation a 10 percent savings results, the level of expenditure would be 90. If in the second year a 2 percent savings is experienced, that is, expenditure equals 88, one should remember that the first year 10 percent savings was maintained, with a 2 percent decrease on top of that.

TABLE 10
Percent Change in the Average Drug Ingredient Cost (EAC) per Recipient by Aid Category in Control and Experimental Counties Over Time

	% Change by Study Year		
	A 1-2	B 2-3	1-3
Control			
ADC	+3.5	+5.5	+9.25
SSI	+20.4	+10.4	+32.9
ICF	+47.5	+9.6	+61.7
Experimental			
ADC	+0.2	+12.5	+12.7
SSI	+3.7	+1.9	+5.7
ICF	−13.2	+20.3	+4.4

Tables 11 and 12 present data on *all* Medicaid drug expenditures during the study period (including ingredient costs, professional fees, and payment for services received out of county) for recipients residing in the control and experimental counties. The data indicate substantial savings to the Medicaid drug program under capitation.

TABLE 11
Average Expenditures by the Medicaid Program for Drug Services per Recipient in Control and Experimental Counties Over Time

	Study Years		
	1	2	3
Control	$23.26	$28.97	$41.30
Experimental	24.03	27.75	28.50

NOTE: Data were available in aggregate form only, thus statistical tests could not be used.

TABLE 12
Percent Change in Average Expenditures by the Medicaid Program for Drug Services per Recipient in Control and Experimental Counties Over Time

	% Change by Study Years		
	1-2	2-3	1-3
Control	24.5	42.6	77.6
Experimental	15.5	2.7	18.6

Critics could argue that the savings under capitation could have been realized at the expense of withholding needed drug services from Medicaid recipients. This practice may have led to increased illness

levels and, in turn, increased expenditures for medical services other than drugs (for example, hospital and physician services). However, we examined the percent change in total Medicaid expenditures, excluding drugs, in the control and experimental counties over the time of the study, and no significant differences were detected (data not displayed). The fact that we did not know the number of Medicaid eligibles may have had a confounding effect. However, we believe that the Medicaid population in the rural counties under study was stable and the aid category mix of the counties was equivalent over time.

Projected Statewide Savings

Total drug expenditure (ingredient cost plus professional fee) for the Iowa Medicaid Program for the 12 month period beginning July 1979 and ending June 1980 was $14,312,983. To separate ingredient costs from professional fees, the total number of prescriptions (1,698,345) was multiplied by the maximum allowable fee which was in effect during this time period ($2.55). This calculation resulted in total ingredient cost expenditures of $9,982,203. Because the professional fee paid to pharmacies is generally lower than $2.55, this ingredient cost estimate is conservative.

Table 13 estimates the annual savings in ingredient costs which may result if capitation were implemented on a Statewide basis in Iowa. First, the proportions of drug expenditures represented by the three general aid categories are multiplied by estimated ingredient cost expenditures (column (1) × column (2)). These products (column (3)) are then multiplied by their respective estimated yearly savings for ingredient costs for the entire State (column (4)).[6]

[6]Estimated yearly percentage savings were derived by adding the percentage savings for capitation year one to the sum of percentage savings for years one and two (Table 10). The sum of these three percentages was then divided by two to yield average annual percentage savings. This method takes into account the fact that the savings in the first year is maintained and, ultimately, added to the marginal savings in the second year.

The results are displayed in column (5). Thus, an annual savings of 16.6 percent for Medicaid drug expenditures ($2,379,543 ÷ 14,312,983) would accrue to the State of Iowa, the Federal Government, and the pharmacy practitioners. One half of these savings ($1,189,771) would accrue to the State of Iowa and the Federal Government, and the remaining half would be distributed to the participating pharmacists as a bonus at the end of the first year, if the program were implemented Statewide.[9] These estimates assume that the number of Medicaid eligibles and their drug use patterns within the State would remain the same as they were in Fiscal Year 1979-1980. Furthermore, we assumed that the prescribing and dispensing behavior of physicians and pharmacists in metropolitan areas would mirror that observed in the rural counties in this study. As stated previously, no chain drugstores were included in the study. Thus, the projected savings are based in part on the assumption that pharmacists employed by chain drug stores would react in a manner similar to independent pharmacists.

Summary

Changes in the use of drug services and their corresponding costs were evaluated when the conventional fee-for-service system for reimbursement of pharmacists was replaced by a capitation system.

Drug use was similar among control and experimental counties, with the exception of patients in the ICF aid category; use in the ICF aid category decreased under capitation and increased under fee-for-service.

[9]In the project which has just been initiated in one-third of the State of Iowa, 20 percent of projected expenditures for drug services are withheld in an escrow account. This account is used to reimburse pharmacists whenever their costs under capitation exceed the amount they would have received had they remained under fee-for-service. These reconciliations are made on a quarterly basis. At the end of each half-year, the amount remaining in the escrow account is distributed equally between the Medicaid program and the pharmacists.

TABLE 13
Estimated Yearly Saving for the Pharmacists and the State of Iowa from Capitation by Aid Category

Aid Category	(1) Percentage of Drug Expenditures[1]	(2) Total Ingredient Expenditures ($)	(3) Yearly Ingredient Expenditures ($) by Aid Category	(4) Estimated Yearly Percentage Savings[2]	(5) Estimated Yearly Savings ($) For Entire State
ADC	26.1%	$9,982,203	$2,605,355	−.2%	−$5,211
SSI	33.4%	9,982,203	3,334,056	+20.95%	+698,485
ICF	34.3%	9,982,203	3,423,896	+49.25%	+1,686,269
Total	93.8%	$9,982,203	$9,363,307	—	+$2,379,543

[1]These percentages do not total one hundred because the aid categories listed are not exhaustive.
[2]An average of the percentages of Table 10 using the following formula:

$$\left[\frac{A+(A+B)}{2}\right]_{\text{Control}} - \left[\frac{A+(A+B)}{2}\right]_{\text{Experimental}}$$

Using three measures of drug cost: 1) average cost of a day's drug therapy; 2) average drug costs per recipient; and 3) average Medicaid expenditures for drug services per recipient, significant savings were observed under the capitation reimbursement system as compared to fee-for-service. Savings under capitation were attributed to shifts in prescribing and dispensing behavior, as well as changes in use within the ICF category. Based upon these findings, the total savings resulting from implementing capitation would be approximately 16 percent when compared to fee-for-service reimbursement. One-half, or 8 percent, of this amount would accrue to the pharmacists and the remainder should be returned to the taxpayers through reductions in the State and Federal Medicaid expenditures.

Conclusion

The findings from the two-county pilot project appear favorable. Therefore, capitation reimbursement was extended to thirty-two randomly chosen counties in central and eastern Iowa on April 1, 1981, to determine if the findings of the pilot project could be replicated on a wider scale, especially in large urban areas. The expanded program will be evaluated primarily on the basis of cost, quality and provider acceptance. If this evaluation indicates that capitation is superior to fee-for-service reimbursement, the entire State of Iowa may convert to capitation reimbursement for its Medicaid drug program.

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