Effect of Peer Review in Medical Foundations on Qualifications of Surgeons

THE "MEDICAL FOUNDATION" PATTERN for financing and delivery of medical care is advocated by many as a method of providing comprehensive physician services, with controls that promote both quality and economy. Organized initially in San Joaquin County, Calif.—in response to the "threat" of a prepaid group practice plan being launched in that county by the Kaiser-Permanente Health Plan—the San Joaquin Medical Society's Foundation for Medical Care aimed to demonstrate that, within the existing pattern of private medical practice and fee-for-service payment, comprehensive services could be offered through insurance at competitive premiums, so long as there was careful review of all the work done by participating physicians (*1*).

This review would have the effect of eliminating or reducing payment for unjustified services, thereby achieving both economies and protection of medical care quality. It was also expected that the continuing operation of this professional review would achieve a higher level of self-discipline among local physicians, so that various procedures would increasingly be done only by physicians properly qualified to perform them.

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The Question Posed

An opportunity to test this effect of the medical foundation pattern was presented by a study of the operations of the California Medicaid program (Medi-Cal) under several modes of service delivery. One of these modes was the San Joaquin Foundation for Medical Care, which contracted with the California State Department of Health Care Services—responsible for the Medi-Cal program—for provision of all physician services to welfare beneficiaries in San Joaquin and three small adjoining counties, on the basis of a flat per capita monthly premium. The findings of this investigation with respect to rates of medical care utilization, expenditures, and other matters have been reported (*2*).

Our concern here is solely with the effectiveness of the foundation pattern in achieving professional self-discipline toward protection of quality. More specifically, we set out to examine the extent to which various surgical procedures were in fact done by properly qualified surgeons.

To make such judgments, we decided that the soundest design required a comparison or control county in which the general circumstances of the Medi-Cal program were similar to those in San

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Joaquin County but without the existence of a medical foundation. (A before-and-after design in San Joaquin County was not feasible, since the medical foundation had been started there in 1954, long before the Medi-Cal program began.) To select an appropriate comparison county, we considered all 58 counties in California with respect to seven variables considered relevant to the operation of a program of public medical care for the poor. These variables were:

1. Total population
2. Percentage employed in agriculture, forestry, and fisheries
3. Average income per household
4. AFDC recipients per 1,000 population
5. Average monthly Medi-Cal cost per AFDC recipient
6. Physicians per 100,000 population
7. Hospital beds per 1,000 population

Considering the San Joaquin area figure for each variable as constituting an index of 100, we calculated the corresponding index for each of the other counties and the overall degree to which each of these other counties deviated—by averaging all seven features—from the San Joaquin area. By this technique, Kern County was found to be most closely comparable, but unfortunately this county could not be used since it also has a medical foundation. The next closest was Ventura County. The data for these three counties, plus a fourth (Tulare) as an illustration of the numerous rejected counties, are shown in table 1. Thus, of the 58 counties in California, Ventura was more closely comparable to the San Joaquin area than any other jurisdiction in the State lacking a medical foundation. Our methodology, therefore, called for comparison of the surgical experience among Medi-Cal beneficiaries under the San Joaquin Foundation (which actually covers three other very small rural counties as well) with that in Ventura County.

Methodology

The investigation required three sets of data: (*a*) the numbers of various surgical operations performed on Medi-Cal beneficiaries in the two study areas, (*b*) the numbers of physicians of various specialty qualifications (surgical and other) in the two areas, and (*c*) the identification of the physician performing each surgical procedure.

With respect to the first set of data, information was gathered from the "paid claims" computer tapes of the State Department of Health Care Services for services performed during the 12-month period February 1968 through January 1969. (Since the capitation contract with the San Joaquin Foundation started February 1, 1968, this period constituted the first full year of the program.) In this period, more than 10,000 surgical procedures were performed on the study populations; but, in order to attain statistical reliability, it was deemed necessary to confine our

examination to those specific procedures which had been performed at least 20 times in each comparison area during the study year. There proved to be 16 such procedures (table 2).

With respect to the second set of data on the physicians practicing in the two study areas, information was obtained from the "Directory of the American Medical Association." This source identifies the specialty status of each physician, which—combined with population estimates from the State government—permitted us to calculate physician to population ratios in each specialty. This was important to reveal whether there were roughly comparable ratios of specialists available to the populations in the two study areas.

With respect to the third set of data identifying the physician performing the surgical procedure on each Medi-Cal patient, the information was obtained also from the State paid claims tapes. In this task, however, a problem was created by the fact that in the San Joaquin area about 28 percent and in the Ventura County area about 5 percent of the surgical operations were performed through partnerships or group practice clinics. The identification of the precise physician in these medical groups doing the surgery would have required further investigation which we were not able to carry out. Therefore, we eliminated from the study surgical patients served by medical groups in either area; our data, then, apply only to work done by individual practitioners who handled the vast majority of operations.

A fourth methodological step, not involving data collection but expert judgment, was necessary. To determine the extent to which surgical procedures were performed in each study area by "properly qualified" physicians, it was necessary

Table 2. Selected surgical procedures and type of physician judged to be properly qualified to perform each procedure

Surgical procedure	Type of physician
Complex laceration repair	General or specialty
Arthrocentesis (for aspiration or injection)	Orthopedist
Appendectomy	General or specialty
Cholecystectomy	Do
Cystoscopy	Urologist
Tonsillectomy (under age 17)	General or specialty
Extraction of lens (eye)	Ophthalmologist
Herniaplasty (inguinal)	General or specialty
Prostatectomy (transurethral)	Urologist
Urethra dilatation, female	Do
Cauterization of cervix	General or specialty
Biopsy of cervix	Obstetrician-gynecologist
Uterine dilatation and curettage	Do
Hysterectomy	Do
Total maternity care	Do
Obstetrical delivery	Do

Table 1. San Joaquin Foundation area compared with selected other California counties, by sociomedical features relevant to Medi-Cal, 1967

Sociomedical factors	San Joaquin area [1]		Other county indices		
	Number	Index	Kern	Ventura	Tulare
Total population [2]	324,300	100	103	100	59
Percent in agriculture, forestry, fisheries [3]	26.0	100	100	72	190
Average income per household [2]	$8,376	100	100	113	89
AFDC recipients per 1,000 [4]	53	100	117	53	164
Average Medi-Cal cost (AFDC) per month [5]	$13.66	100	96	108	106
Physicians per 100,000 [6]	122	100	76	94	65
Hospital beds per 1,000 [6]	3.94	100	93	86	67
Average deviation		0	7.9	16.6	40.0

[1] Area includes San Joaquin County (population 280,300), Amador (12,200), Calaveras (11,800), and Tuolomne (20,000).
[2] Survey of Buying Power. Sales Management, Inc., New York, 1968.
[3] Derived from California Statistical Abstract, 1967, table C–4. State of California Department of Finance, Sacramento. Includes only employment subject to disability insurance provisions of the California Unemployment Insurance Code.
[4] Number of persons receiving AFDC cash grants in September 1967, reported in California Medical Assistance Program Services and Payments Report, July-September 1967, as percentage of total population, January 1, 1967. Office of Health Care Services, Sacramento.
[5] Based on Medi-Cal AFDC payments April 1967–March 1968 and AFDC caseload September 1967, reported in California Medical Assistance Program Services and Payments Reports, March 1967–April 1968. Office of Health Care Services, Sacramento.
[6] Derived from Distribution of Physicians, Hospitals, and Hospital Beds in the U.S., 1967, table 12. American Medical Association, Chicago.

to solicit objective and informed opinions from impartial experts, with respect to each of the 16 procedures. This was done by posing the question to a panel of three physicians—a surgeon, an anesthesiologist, and an internist. For each procedure, these three specialists were asked to indicate which type of physician, under normal conditions, should be entrusted to perform it. More specifically, four types of physician were classified: (*a*) general practitioner, (*b*) nonsurgical specialist (21 types), (*c*) general surgeon, and (*d*) specialty surgeon (9 types). The panel members were then asked to indicate which of these types constitutes the lowest order of specialty that should normally perform each procedure, under conditions of good quality medical care.

In addition to the 16 surgical procedures (performed at least 20 times in each of our two study populations), table 2 shows the judgment of the expert panel on the properly or optimally qualified type of physician among the four types possible. For 13 of the 16 procedures, the judgment of the three panel members was unanimous, and for only 3 was there a divided vote of 2 to 1.

Findings

Before we present the findings on the qualifications of physicians doing the selected surgical procedures in the two study areas, it will be helpful to consider the overall rate of performance of these procedures in the Medi-Cal population of the two study areas (table 3).

In the year of study (February 1968 through January 1969), the total populations and the eligible Medi-Cal populations in the two study areas were as follows:

Study area	*Total*	*Medi-Cal*
San Joaquin County area	328,700	60,125
Ventura County	354,700	34,985

Despite this difference in welfare caseloads, the overall rates of surgical operations in the two areas were quite similar, as follows:

Study area	*Number*	*Rate per 1,000*
San Joaquin Foundation area ..	7,115	118
Ventura County	3,702	106

In spite of this slightly higher rate of surgical procedures in the San Joaquin Foundation area, table 3 shows that for 11 of the 16 procedures analyzed (including the two procedures of highest frequency—total maternity care and tonsillectomy), the rates in the San Joaquin area were lower than in the Ventura area. It is highly likely that these differential rates for specific procedures are influenced substantially by the omission in this analysis of all services performed through medical groups which, it will be recalled, were much more numerous in the San Joaquin area.

Furthermore, one may note that the overall Medi-Cal surgical rates in both study areas (118 and 106 per 1,000 population) are substantially higher than the U.S. national rate of surgery of about 75 per 1,000 in 1968, as reported in the continuing survey of the National Center for Health Statistics (*3*). This differential may be explained by our inclusion of maternity cases as "surgical," while these are excluded in the NCHS data, as well as by the age-sex composition of public assistance recipients—higher for women, children, and aged persons, in whom surgical rates are typically greater than among other age-sex groups. There may also be higher surgical rates among the poor for certain conditions (such as trauma or herniaplasty) because of epidemiologic factors associated with poverty (*4*).

Table 3. Surgical procedures performed by individual physicians in two study areas—rates in Medi-Cal populations at risk

Surgical procedure	Number	
	Ventura	San Joaquin
	Per 10,000 total persons	
Complex laceration	8	32
Arthrocentesis	26	17
Appendectomy	12	7
Cholecystectomy	23	18
Cystoscopy	16	7
	Per 10,000 under age 17	
Tonsillectomy	285	202
	Per 10,000 age 45 or over	
Extraction of lens	49	55
	Per 10,000 men	
Herniaplasty	43	26
Prostatectomy	21	9
	Per 10,000 women	
Urethra dilatation	21	17
Cauterization of cervix	10	24
Biopsy of cervix	12	14
Uterine dilatation and curettage	20	19
Hysterectomy	24	21
	Per 10,000 women, age 15–44	
Total maternity care	457	312
Obstetrical delivery	34	36

The numbers of physicians of various specialty qualifications practicing in the two study areas are presented in table 4. These figures are based on a universe of 331 private practitioners serving the Ventura County population of 354,700 and 329 such physicians serving the San Joaquin Foundation area population of 328,700 (as of July 1, 1968). As noted earlier, these data are relevant to a consideration of availability of the appropriate specialists, which would obviously influence the possibility of having particular procedures done by the "properly qualified" type of physician in each area.

The overall ratio of physicians to population in the two areas is quite similar, although slightly higher (by about 6 percent) in the San Joaquin area (table 4). With respect to the nonsurgical specialists and the several surgical specialties, the rates per 100,000 population are remarkably similar in the two study areas—considering either the total in each class or only those who are board certified. (A high proportion of the other specialists were doubtless board eligible.) Only in the class of "general surgeons" is there a relatively large difference, with the San Joaquin area having nearly a 50 percent higher ratio than the Ventura County area (12.8 compared with 8.7 per 100,000). However, of the 16 surgical procedures studied, 10 were deemed to require a specialty surgeon, and for the remaining 6 either a general surgeon or a specialty surgeon was considered appropriate (table 2).

The practice of surgery, either general or in a subspecialty, moreover, permits a wide elasticity in the use of professional time. In other words, the availability of surgical time for patient care in the American setting can be considered significantly affected only by a very wide differential in the supply of surgeons. All things considered, therefore, it would seem reasonable to conclude from table 4 that the availability of surgical manpower in the two study areas was, for all practical purposes, the same for Medi-Cal beneficiaries. Differences in the use of "properly qualified" physicians for various surgical procedures accordingly could probably not be attributed to any differentials in the supplies of these physicians in the two areas.

The findings on the basic question posed in this study, the proportions of various surgical procedures performed by properly qualified physicians in the two comparison areas, are presented in

Table 4. Physicians in two study areas: ratios in active private practice,[1] by specialty

Types of physicians[2]	Number per 100,000 population			
	Ventura		San Joaquin	
	Board certified	Total	Board certified	Total
General practitioners	..	27.9	..	31.0
Nonsurgical specialists	16.6	34.4	14.9	33.2
General surgeons	3.1	8.7	5.5	12.8
Surgical specialists	8.7	22.3	9.7	23.1
Orthopedists	1.7	3.7	2.4	4.0
Urologists	0.8	2.3	0.9	2.4
Obstetricians-gynecologists	2.3	8.2	1.8	7.6
Ophthalmologists	2.3	4.2	2.1	3.4
Other	1.6	3.9	1.9	5.7
All physicians	..	93.3	..	100.1

[1] Excluded are hospital interns, residents, and other full-time medical staff; physicians in full-time administration, teaching, or research; and those retired or otherwise not in private practice.

[2] Physicians are classified by their highest primary or secondary specialty, whether board certified or not. Excluded are 2 physicians with no reported specialty.

Table 5. Surgical procedures and the percentage of each performed on Medi-Cal patients by properly qualified surgeons in two study areas

Surgical procedure	Total number performed		Percentage by qualified surgeon	
	Ventura	San Joaquin	Ventura	San Joaquin
Complex laceration repair	27	193	29.6	20.2
Arthrocentesis	89	104	37.1	16.3
Appendectomy	41	45	53.7	60.0
Cholecystectomy	79	108	59.5	75.9
Cystoscopy	56	43	96.4	100.0
Tonsillectomy	261	417	28.0	46.0
Extraction of lens	86	137	89.5	100.0
Herniaplasty	63	74	47.6	63.5
Prostatectomy	30	25	100.0	100.0
Urethra dilatation (female)	43	54	93.0	98.2
Cauterization of cervix	21	77	33.3	62.3
Biopsy of cervix	24	44	58.3	59.1
Uterine dilatation and curettage	42	61	52.4	60.7
Hysterectomy	47	65	44.7	69.2
Total maternity care	311	331	37.9	46.5
Obstetrical delivery	23	38	60.9	65.8
All procedures	1,243	1,816	48.7	54.9

table 5. By the crudest count, for 13 of the 16 surgical procedures the percentage of cases handled by properly qualified surgeons is higher for the San Joaquin County area, for 2 it is higher for Ventura County, and for one (transurethral prostatectomy) it is the same (at 100 percent) in both areas. Among the 15 procedures in which there are differentials, however, many are small and not statistically significant. Applying a significance test (for difference between two proportions) to these data, we find that the differences are statistically significant at the 5 percent level for arthrocentesis, cholecystectomy, tonsillectomy, extraction of lens, cauterization of cervix, hysterectomy, and total maternity care. Six of these seven procedures (all except arthrocentesis) are more often done by the properly qualified physician in the San Joaquin County area. The weighted average for all 16 types of surgical procedures shows that 54.9 percent of them were performed by a properly qualified physician in the San Joaquin area compared with 48.7 percent in Ventura County.

This differential is probably a conservative estimate of the difference between the two study areas, since it may be recalled that our analysis excluded surgical procedures done through group practices, and such practices accounted for a much higher proportion of surgical operations done in the San Joaquin area than in Ventura County (28 versus 5 percent). It would seem likely, based on national data, that surgical procedures done through group practices are more frequently done by properly qualified specialists than under conditions of solo medical practice. If the operations done under both individual and group practice patterns could have been analyzed, it is likely that the differential for qualifications of physicians in favor of the San Joaquin area would be somewhat greater.

Conclusion

From these findings on the qualifications of physicians performing relatively common surgical procedures, we may conclude that the conditions in the San Joaquin County area are associated with better-quality personnel standards than in Ventura, a comparable county. It is highly likely that this difference is due to the operation of a Foundation for Medical Care in the San Joaquin area but not in Ventura County.

This influence may well be due to the operation in the medical foundation setting of a disciplinary influence of peer review of claims, discussed at the outset. It may also be due to the generally higher rate of participation of the physicians, particularly the specialists, of the San Joaquin area in the whole Medi-Cal program, reported in another study (*5*). The prepaid contract between the State Department of Health Care Services and the San Joaquin Foundation for the care of Medi-Cal beneficiaries seems to put a certain moral pressure on the local physicians to serve these patients who, in other counties, are more often rejected by local physicians.

This conclusion on surgical qualifications concerns an assessment of quality from the viewpoint of what Donabedian (*6*) has called "structure" or manpower input. It tells us nothing about evaluation of quality at the deeper levels of "process' or "outcome," for which other data would be required (*7*). Nevertheless, these findings suggest that the medical foundation mechanism has a favorable influence on the behavior of physicians in private practice, in accordance with generally recommended criteria for professional performance.

REFERENCES

(*1*) Sasuly, R., and Hopkins, C. E.: A medical society-sponsored comprehensive medical care plan. Med Care 5: 234–248, July–August 1967.

(*2*) Gartside, F. E.: The utilization and costs of services in the San Joaquin prepayment project. University of California, School of Public Health, Los Angeles, January 1971. Processed.

(*3*) National Center for Health Statistics: Surgical operations in short-stay hospitals, United States 1968. DHEW Publication No. (HSM) 73-1762, Ser. 13, No. 11. U.S. Government Printing Office, Washington, D.C., January 1973.

(*4*) Flashner, B. A., Reed, S., Coburn, R. W., and Fine, P. R.: Professional standards review organizations: analysis of their development and implementation based on a preliminary review of the hospital admission and surveillance program in Illinois. JAMA 223: 1473–1484, Mar. 26, 1973.

(*5*) Gartside, F. E., and Procter, D. M.: Physician participation in the San Joaquin prepayment project. University of California, School of Public Health, Los Angeles, January 1970. Processed.

(*6*) Donabedian, A.: Promoting quality through evaluating the process of patient care. Med Care 6: 181–203, May–June 1968.

(*7*) Roemer, M. I.: Evaluation of health service programs and levels of measurement. HSMHA Health Rep 86: 839–848, September 1971.