Public Health Briefs

The Impact of a Pediatric Practice on Hospital Admissions in a Rural Area

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Abstract: The establishment of a two-man pediatric practice in a rural area of New Mexico was followed by a decrease in hospital admissions of children and an increase in average length of stay. While other factors may have been involved, the reliance of the study region's children on pediatricians rather than family physicians for primary care may have contributed to the decline in hospitalization. Further research on the relationship between source of care and hospital utilization is needed. (*Am J Public Health* 1980; 70:1100-1103.)

The benefits of reducing inappropriate hospitalization are well documented.[1, 2] Monitoring of the hospitalization process by third-party payers or review boards may be effective in discouraging unnecessary utilization, but may have more effect on length of stay than on admission rates.[3] In rural areas particularly, admission rates may reflect availability of primary care physicians as well as an oversupply of hospital beds. Inpatient care may substitute, to some extent, for ambulatory care in areas undersupplied with physicians.[4] The type of training of the primary care physician may also influence admission rates.

For some years now, national policy has encouraged increase in the number of primary care physicians and a redistribution of physician manpower.[5] Part of this strategy includes a financial commitment to expand the number of primary care physicians (primarily family physicians, pediatricians, and general internists).[6-10]

Both pediatricians and family physicians (whose training backgrounds are different) are capable of providing primary care to children. There is some evidence that pediatricians may admit fewer children to the hospital unnecessarily.[11, 12] The exact relationship of children's hospital utilization to type of primary care provider, however, has not previously been pursued in empirical literature.

In August of 1973, two fully-trained pediatricians* established a private group pediatric practice in a rural area of Northeastern New Mexico. Prior to the establishment of the pediatric group practice, the care of children had been assumed by local general practitioners, family practitioners, and public health workers employed by the County Health Department. After two years, these pediatricians had assumed the primary care of approximately 75 per cent of the children within their region.**

In 1975, a study to determine the impact of this practice on hospital utilization by children in this region was undertaken. The results of that study are presented here.

Methods

Hospital utilization data, classified by patient origin and discharge diagnosis, were collected from the hospitals in the study region (region A) for the years 1970 through 1975. The population data used in the calculations were obtained from the 1970 National Census. Similar data were collected for two contiguous regions for the same time period.*** One of these regions (region B) serves as a comparison group for the study region. Regions A and B are both poor (although region B has a slightly higher median income), sparsely settled, and predominantly Hispanic. Region B had no influx of addi-

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*Licensed physicians who had completed an approved pediatric residency program and had passed the written examination for Specialty Board Certification.

**All estimates were made by the regions' physicians and local hospital administrators.

***Bordering counties separated from study region by mountains.

tional pediatricians during the study period. The one pediatrician practicing in region B is the primary physician for approximately 20 per cent of the children living in that area. The remaining 80 per cent of the children have been utilizing family physicians as their primary physicians. The third region (region C) is a more urbanized area where more than 60 per cent of the children utilize fully-trained pediatricians as their primary physicians.** This region, with two hospitals (one of which only serves native American Indians), is a referral center for regions A and B for secondary care in urology, orthopedics, otorhinolaryngology, neurology, and neurosurgery.

It became apparent from the initial examination of the hospital utilization data that the approximately 2,500 American Indian children in regions B and C are heavy users of a United States Public Health Service Hospital located in region C (approximately 700 annual patient days per 1,000 children). Because the hospitalization experience of these children reflects, in part, unique health care needs and referral processes, and because there are no American Indian children in the study region, utilization data on these children were excluded from the analysis.

Findings

As Table 1 shows, yearly patient days per 1,000 children had been declining in the study region (region A) even before the arrival of the two pediatricians in 1973. The decrease in patient days before 1973, however, appears to have been accounted for at least as much by a decrease in the average length of stay as by a decrease in admissions. After 1973, the pattern changed markedly. The total number of admissions declined abruptly from 63 per 1,000 in 1973 to 16 per 1,000 in 1975. At the same time, the average length of stay increased from 2.85 days in 1973 to 4.64 in 1975. Overall patient days declined from 178 per 1,000 children in 1973 to 73 per 1,000 in 1975. The fact that the average length of stay increased while admissions declined suggests that children were, increasingly, being admitted to the hospital only for more serious conditions.

In contrast, both admissions and length of stay remained relatively constant for region B during the study period, with only a slight decrease in total patient days per 1,000 children.

Region C, which serves as a referral center for both regions A and B, experienced a decline in admissions during the study period, suggesting that referrals to region C for secondary care did not account for the lowered admissions in region A.

Table 2, which gives a breakdown of admissions by major diagnostic category, shows that admissions in region A decreased for all categories after 1973. The change was most dramatic, however, for respiratory problems. Also, there was a decrease in the number of tonsilectomies and adenoidectomies performed (Table 3), a surgical procedure frequently singled out in studies of excess surgery.

As Table 1 shows, region A's decrease in hospital admissions cannot be accounted for by changes in birth rate, since the annual variation in the number of births has been modest. As shown in Table 4, both regions A and B experienced closure of local hospitals within a nine month period. These closures reduced the number of available beds in the respective regions, more sharply in region A than in Region B. However, the remaining open hospitals in both regions continued to have low occupancy rates. The physicians who had admitting privileges at the hospitals which closed also had admitting privileges for at least one of the remaining open facilities in their respective regions.

Discussion

The decrease in short-stay hospital admissions in region A may be unrelated to the establishment of a pediatric group practice. Data on children who were hospitalized outside the three regions were not gathered for this case study. The reduction in hospital beds was greater in the study region than in the control region. Although there was no subsequent saturation of the remaining open hospitals in the two regions, the exact impact of the hospital bed reduction was not ana-

TABLE 1—Annual Hospital Utilization Rates of Children[1] and Number of Births of Residents in the Three Study Regions, 1970–1975

Year / Region	Patient Days per 1000 children			Admissions per 1000 children			Average Length of Stay			Number Births of Residents In Region per Year[3]		
	A	B	C	A	B	C	A	B	C	A	B	C
1970	258	241[2]	211	70.0	65.0[2]	46.0	3.69	—[2]	4.59	547	1065	1102
1971	215	306	157	63.0	84.0	38.0	3.41	3.66	4.15	628	1132	1129
1972	178	284	130	61.0	76.0	34.0	2.94	3.75	3.86	515	1016	1040
1973	178	300	113	63.0	77.0	29.0	2.85	3.87	3.86	517	1047	1080
1974	124	265	76	27.0	68.0	21.0	4.54	3.89	3.70	502	1010	1059
1975	73	204	86	16.0	61.0	20.0	4.64	3.32	4.37	462	964	991

[1]14 years old and under, excluding newborns and Native American Indians admitted to USPHS Hospital located in region C.
[2]Data for one of Region B hospitals unavailable, January-June 1970.
[3]Vital Statistics Reports, New Mexico Dept. of Health and Environment, 1970-1975.

TABLE 2—Rates and Numbers[1] of Hospital Admissions of Children, by General Diagnostic Category[2] in the Three Study Regions (rates per 1000 Children ≤ 14)

Year / Region	Infectious & Parasitic (001-136)[3]			Nervous System (320-405)			Respiratory (460-519)		
	A	B	C	A	B	C	A	B	C
1970	6.8 (57)	9.6 (136)	8.8 (152)	2.6 (22)	5.2 (73)	*	32.7 (273)	35.4 (501)	43.5 (754)[5]
1971	8.7 (73)	15.6 (221)	14.6 (253)	4.9 (41)	7.1 (101)	9.2 (160)	36.6 (306)	37.0 (524)	38.0 (659)[5]
1972	6.6 (55)	10.4 (147)[4]	10.2 (177)	3.3 (28)	4.5 (64)[4]	14.3 (247)	36.8 (308)	30.7 (434)[4]	34.1 (591)[5]
1973	8.5 (71)	11.5 (163)	9.6 (166)	5.1 (43)	4.3 (61)	11.8 (204)	33.4 (279)	26.5 (375)	29.0 (502)[5]
1974	2.3 (19)	11.9 (168)	5.7 (99)	2.0 (17)	6.6 (94)	9.4 (162)	12.2 (102)	38.1 (539)	17.7 (307)[5]
1975	3.0 (25)	11.0 (157)	5.9 (103)	0.2 (2)	4.1 (58)	9.0 (156)	6.1 (51)	33.1 (469)	20.0 (347)

Year / Region	Digestive (520-577)			Injuries & Accidents (800-999)		
	A	B	C	A	B	C
1970	12.1 (101)	14.3 (203)	8.5 (148)	9.4 (79)	11.0 (156)	16.0 (277)
1971	8.7 (73)	13.2 (188)	9.3 (161)	12.4 (104)	11.7 (165)	21.5 (373)
1972	7.8 (65)	7.0 (99)[4]	8.7 (150)	8.9 (74)	8.7 (123)[4]	21.5 (373)
1973	6.8 (57)	5.8 (82)	9.2 (160)	14.0 (117)	10.0 (142)	26.7 (463)
1974	4.7 (39)	8.3 (118)	6.1 (105)	10.8 (90)	16.6 (235)	18.9 (327)
1975	4.7 (39)	8.6 (122)	7.3 (126)	2.6 (22)	14.2 (201)	18.0 (312)

SOURCES:
[1]( ) = absolute number
[2]Some admissions listed more than one diagnostic category
[3]Insufficient number of admissions in other diagnostic categories for analysis, therefore omitted.
[4]Excludes Numerator data for 6 months (Jan-June) of one of Region B hospitals—Diagnostic data unavailable.
[5]Excludes T & A admissions
NOTE: Region C hospital receives referrals from A & B for neurology, orthopedic, GU, ENT, & Plastic Surgery. Population denominators are: Region A, 8,360; Region B, 14,150; Region C, 17,320.

lyzed. Factors unknown to the investigators and influencing access to primary care may have changed during the study period. Even if decreased admissions did result from the pediatricians' role in primary care, it is not clear whether this reflects their training as pediatricians or other characteristics such as age, length of practices, and patient education programs. The shift to longer stay and fewer hospital admissions in the study region cannot easily be dismissed as an artifact, however.

Further research examining the relationship between source of primary care and hospital utilization is needed. If children who use pediatricians as their primary source of care do, in fact, experience less hospitalization than other children, then it is important to attempt to understand what characteristics of pediatricians or of pediatric practice account for this pattern.

TABLE 3—Rates and Numbers[1] of Hospital Admissions of Children for Tonsillectomies and Adenoidectomies (rates per 1000 ≤ 14)

Year	Region A	Region B	Region C[2]	Total A + B + C
1970	7.4 (62)	5.3 (75)	2.1 (36)	4.3 (173)
1971	8.2 (69)	4.2 (60)	2.8 (48)	4.4 (177)
1972	7.2 (61)	6.2 (89)	3.5 (61)	5.3 (211)
1973	5.7 (48)	5.2 (73)	2.1 (36)	3.9 (157)
1974	1.3 (11)	4.5 (63)	2.6 (45)	3.0 (119)
1975	0.4 (3)	5.3 (75)	*	—

Source:
[1]( ) = Absolute number
[2]Referral area for ENT Consultation from A & B
*Data Unavailable

TABLE 4—Hospitalization Utilization Data, 1970 and 1974

	Region	Year 1970	Year 1974
Total Population	A	26,600	28,600
	B	42,700	46,100
	C	57,800	60,700
Hospital Beds	A	98	58[1]
	B	167	134[2]
	C	215	201[3]
Per Cent Beds Occupied	A	49.2%	56.0%
	B	52.3%	59.4%
	C	83.7%	74.2%
Beds/1000 Population	A	3.7	2.0
	B	3.9	2.9
	C	4.0	3.3

[1]40 beds in one facility closed June 1973.
[2]33 beds in two limited facilities (15 beds and 18 beds respectively) closed February 1974.
[3]14 beds in 215-bed facility closed February 1973.
[4]Occupancy rate in Region B Hospital I is 57.4%; in Region B Hospital II is 64.2% with total occupancy rate for Region B being 59.6%. Regions A and C had only one hospital each in 1974.
SOURCE: North Central New Mexico Comprehensive Health Planning Council (NorCHaP) plan for Personal Health Services, 1975.

REFERENCES

1. Sparer BA and Anderson BS. Utilization and cost experience of low-income families in four prepaid group-practice plans. N Engl J Med, 1973; 289:67-72.
2. Vernon DTA, et al: The Psychological Responses of Children to Hospitalization and Illness. A Review of the Literature. Springfield, IL, 1965.
3. Shonick W: Factors associated with changes in occupancy rates of California short-term hospitals. Med Care 1976; 14:674-684.
4. Anderson JG: Demographic factors affecting health services utilization. Med Care 1973; 11:104-120.
5. Dans PE: Politics in the development of a migrant health center. N Engl J Med 1975; 292:890-895.
6. Stimmel E: The Congress and health manpower: A legislative morass. N Engl J Med 1975; 293:68-74.
7. Comprehensive Health Manpower Training Act (PL 90-490), 1968.
8. Draper P and Smits H: The primary care practitioner. N Engl J Med 1975; 293:903-907.
9. Petersdorf RG: Internal medicine and family practice. N Engl J Med 1975; 293:326-332.
10. Froom J: International health problems in primary care. JAMA 1975; 234:1257-1258.
11. Duff RS, Cook CD, Wanerka GR, et al: Use of utilization review to assess the quality of pediatric in-patient care. Pediatrics 1972; 49:169-176.
12. Duff RS, Cook CD, Margolis CZ, et al: Review of pediatric in-patient care. Am J Dis Children 1975; 129:1422-1424.

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The Prevalence of Intestinal Parasites in Puerto Rican Farm Workers in Western Massachusetts

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Abstract: A parasitic surveillance of farm workers of Puerto Rican background and their children revealed a high prevalence rate (35.5%) of parasites in this population. This high prevalence rate, however, was expected in view of the fact that other researchers have found a high degree of parasitosis in Puerto Rican populations residing on the US mainland. However, the prevalence rate was almost double that reported by Winsberg, et al, for the urban population, thus suggesting a higher degree of exposure to the migrant worker than to his counterpart living in the cities. Two cases of hookworm infections were detected in children born in the United States who had never traveled outside the area, thus confirming that there is ample opportunity for the transmission of pathogenic parasites on farms, and also suggesting that migrant workers must live under poor sanitary conditions. (*Am J Public Health* 1980; 70:1103-1105.)

Faust, *et al*,[1] Maldonado,[2] Maldonado and Oliver-Gonzales,[3,4] Weller and Damin,[5] and more recently Acholonu,[6] and Greenberg and Ferguson[7] have all documented the high prevalence of helminthic and protozoan infections in Puerto Rican highlands and urban areas. A high percentage of Puerto Ricans migrating to the US mainland bring parasitic infections.[8-10,11-13] These studies have concerned themselves with preschool and school children,[7,8,11,14] or with hospitalized or ambulatory patients.[9,10,12,13] One study done in Chicago, which surveyed a generally asymptomatic population, may give a truer picture of the extent of parasitosis in the Puerto Rican population which has settled in large urban areas on the mainland.[15]

To the best of our knowledge Puerto Rican farm workers on the mainland have not been surveyed for parasites. We undertook the survey reported here in order to provide some information about this segment of the population.

Methods and Materials

Our subjects were all members of farm worker families of Puerto Rican origin residing and working in the area of Holyoke, Massachusetts. For the most part, this population works in tobacco and produce farms between May and October. The population was contacted by a bilingual health advocate, who explained the aim of the study to the workers, and collected stool samples for analysis.

Stool samples were brought into the laboratory the same day they were collected; all were refrigerated and examined within 24 hours after being passed. First, stools were visually scanned with the aid of a 5X hand magnifying glass for the presence of adult helminths; this was followed by a wet preparation. Regardless of whether specimens were positive or negative by the above examinations, further concentrations

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