

Use of Emergency Room Services by the Population of a Neighborhood Health Center

MARSHA R. GOLD and ROBERT G. ROSENBERG, MD

IN RECENT YEARS, neighborhood health centers have been advocated as a vehicle for delivering high quality medical care to low income people. It was hoped that the establishment of neighborhood health centers would overcome the impersonal, fragmented, inaccessible, and episodic care that is characteristic of hospital outpatient departments and emergency rooms, which have been a primary source of medical care for the low income population (1). Most of the arguments for establishing neighborhood health centers imply that when people are given a choice between care in hospital facilities or neighborhood health centers, they will opt for the centers. Thus, the following question arises: Now that many neighborhood health centers have been in operation for a few years, to what extent do people continue to use traditional hospital-based services and why?

Previous studies have indicated that—at least in isolated areas—when a neighborhood health center is established, it is used by a large proportion of its target population. These studies also

Ms. Gold, now a health systems analyst at Abt Associates, Inc., Cambridge, Mass., at the time of the study was a graduate student in urban studies and planning at the Massachusetts Institute of Technology, receiving support for the study as a research assistant at the Harvard-M.I.T. Center for Health Services and Technology. Dr. Rosenberg, now senior associate at the Harvard Center for Community Health and Medical Care and assistant professor of pediatrics at Harvard Medical School, at the time of this study was medical director of the Martha Eliot Health Center, Jamaica Plain, Mass.

Tearsheet requests to Ms. Marsha R. Gold, Abt Associates, Inc., 55 Wheeler St., Cambridge, Mass. 02138.

indicate that use of other sources of care continues, but to a lesser extent. Bellin and Geiger (2) found that 2 years after the establishment of a neighborhood health center in an isolated housing project, 71 percent of the target population (and 97 percent of the children in the target population) used the center as their regular source of care. The center's registrants were drawn equally from those who had no previous regular source of care, those who had private physicians, and those who had previously used hospital facilities. The authors assert that most people using the center received their total care from it except for those persons referred elsewhere for specialty care; however, no supporting evidence is given.

Solon (3) reported on the use of a health center in a newly constructed isolated housing project in Pittsburgh. Three years after its opening, he found that 31 percent of the people used it as their central source of care (the source in which people feel most confidence); 42 percent used it as their volume source (the source they use the most); 59 percent used it to some degree; 41 percent never used it. Like Bellin and Geiger (2), Solon found that shifts to the health center occurred equally among people previously using the services of private practitioners and people previously using hospital-based facilities.

Hochheiser and associates (4) studied the pattern of visits to the four most widely used emergency rooms in Rochester, N.Y., 15 months before and approximately 3 years after a neighborhood health center opened. They found a 38 percent reduction in emergency room visits by children at three hospitals in the center's area. During the same period, the number of visits made to these three emergency rooms by city children outside the center's catchment area did not change, and visits by suburban children increased 29 percent.

A number of variables were studied in an attempt to reveal patterns of use. The authors found that one-fifth of the visits to the emergency rooms by children in the center's area were made by children registered at the center, while half were made by children not registered at the center but eligible for its services. Other variables studied, such as child's census tract, age, race, time of visit, payment status, and the reason for the visit did not indicate any meaningful patterns of use.

Despite these studies it is unclear to what extent other sources of care are still used by people eligible for health center services, how such other sources of care are used, and what factors result in different patterns of use. Our study was addressed to part of this question. We examined the use of health center and emergency room services by children served by a mature neighborhood health center.

This mature center, the Martha Eliot Health Center, was established in April 1967 in the Bromley-Heath Housing Project, a low income housing project operated by the Boston Housing Authority. It serves about 17,000 persons within the northern section of the Jamaica Plain area of Boston. The health center has been described by Salber and associates (5). Recently there has been an influx of Spanish-speaking families.

The health center is funded in large part through the Maternal and Child Health Services of the Department of Health, Education, and Welfare. It is affiliated with and operates under the licenses of the Children's Hospital Medical Center, the Boston Hospital for Women, and the Peter Bent Brigham Hospital. Services consist of pediatrics, maternal health, adult health, and children's dental services. A full range of health education, rehabilitation, mental health, and preventive services are given within the center and by other sources in the community.

The registration process of the center consists of assigning clinic record numbers to family members wishing to receive care there and collecting basic health and demographic data. No formal or informal contractual arrangements are made between the center and the registering family. Each child in a family is assigned to the same team. Social services and public health nursing services are provided for the entire family, and a family's records are kept in one folder. During the time of our study, pediatric services were pro-

vided from 9 am to 5 pm on weekdays and from 10 am to 12 pm on Saturdays for emergencies. Visits are by appointment, although patients without appointments are almost always seen.

Salber and associates (5) found that in the center's first year of operation between 40 and 60 percent of the families in the area had registered for its services and that registration rates were higher among black and Spanish-speaking families, families with young children, families on AFDC, and those who lived in the housing project. Families that had been attending hospital clinics before the center opened were more likely to register at the center than families seeing private practitioners (6).

In a later study Salber and associates (7) found that 87 percent of the registered children had received at least one service during the year studied (1968), and 70 percent had been seen by a pediatrician. Use of the center by children was high during that year; 7.2 mean visits per child for all services were made by children living in the housing project and 6.8 visits by children living outside the housing project but in the target area. Once families were registered, socioeconomic variables had little effect upon use. It was found that the predominant pattern of utilization in 1968 for registered patients was that of using the health center in combination with another source of care, mainly hospital clinics (6).

Beyond the services provided by the health center, the children in the target area could use the services of hospitals and the few private physicians nearby. The nearest, most accessible, and most widely used of these sources of care was the Children's Hospital Medical Center. The health center refers children to this hospital for X-rays, specialty care, and consultations. While the hospital's outpatient department delivers mainly specialized pediatric care on a referral basis, its emergency room provides care for acute illness on a 24-hour basis to virtually all children who come there.

In our study we examined use of the Children's Hospital emergency room and the Martha Eliot Health Center by the children residing in the center's target area in an attempt to determine: (a) to what extent each was used by these children, (b) what variables determined differences in such use, and (c) to what extent both were used by the same children and which different patterns of use could be isolated.

Methodology

All visits by children living in the Martha Eliot Health Center's target area to the center's pediatric clinic and to the Children's Hospital emergency room were identified for the 4-week period from January 12, 1971, through February 8, 1971. From billing forms, encounter forms, records, and other sources at the center, information was gathered on each child's age, diagnosis, address, and time and day of visit. In addition, for every child seen at the emergency room and for every fourth child seen at the health center, other information was gathered concerning the child's socioeconomic status and previous history of use of each facility from June 1, 1970, through the end of the study period. The data were then coded, keypunched, and analyzed by computer to provide summaries and cross-tabulations of the different variables studied.

Although it would have been useful to interview patients' parents to determine their attitudes toward both facilities and what other sources of care they might use, we could not do so because of limited time, money, and community resistance to answering yet another questionnaire.

Results

During the 4 weeks studied, almost four times as many children (801) visited the health center as the hospital emergency room (223).

Why did some children use the emergency room and others use the health center during this period? What variables seemed to influence use of the emergency room? Certainly the most important of these seems to be that of time. Almost two-thirds of all visits to the emergency room occurred during hours when the health center was closed. Approximately half of the emergency room visits occurred on Saturdays and Sundays and half during weekdays after the health center was closed, as is shown in the following table, which gives the percentage of visits made by 209 children to the emergency room according to the operating status of the health center.

<i>Operating status of health center</i>	<i>Percentage of visits to emergency room¹</i>
Open	34
Closed:	
Week night	34
Weekend	33

¹ Based on visits of 209 children. Records for 14 children were missing.

This tendency to use the emergency room during evenings and weekends was seen for children not registered at the health center as well as for

those registered. Of the children who visited the Children's Hospital emergency room, 70 percent were registered at the health center. There was no significant difference in the pattern of visits to the emergency room by the registered and unregistered children according to whether or not the health center was open or closed.

The medical problem for which treatment was sought did not affect, in most cases, the choice of facility. Aside from well-child care, which was not provided at the emergency room, few major differences in the pattern of medical complaints at the two locations were found, as the following table giving the percentages of visits by reason for visit shows.

<i>Reason for visit</i>	<i>Emergency room (146 children)</i>	<i>Health center (121 children)¹</i>
Well, preventive, or routine care	1	17
Acute medical	77	65
Surgical	19	9
Psychological	3
Chronic, or recurrent medical, and other condition..	3	6

¹ Figures represent a 25 percent sample of all cases.

Note: Records for 16 children at the emergency room and 6 children at the health center were missing. Chi-square is not significant at the .05 level between facilities or between groups within a facility.

Most children at both the health center and the emergency room had acute medical problems. Most of these problems were either upper respiratory tract or ear infections. Aside from well-child care at the center, the only difference between these two groups of children was that the emergency room patients had a larger proportion of surgical problems; for example, only one fracture patient was seen at the health center whereas six were seen at the emergency room.

Neither did the age of the child seem to influence which facility was used. More than 40 percent of the children visiting the center and the emergency room were under 4.5 years, and about 75 percent were under 10.5 years. Mean ages of children visiting both facilities were similar—at the emergency room the mean age was 6.4 years and at the health center, 6.7 years. The health center did see proportionately more children under 6 months than did the emergency room, a result which possibly reflects on the well-child and maternal care provided by the health center.

The race and ethnic group of the child seemed to influence the choice of health facility somewhat. While the figures lack significance at the .05 level,

they suggest that white children are more likely than black children to be taken to the emergency room rather than the health center, as the following table giving the percentages of visits made by these children to the two facilities shows.

Race-ethnicity	Emergency room (209 children)	Health center (195 children) ¹
White	32	22
Black	45	54
Spanish-American	23	25

¹ Figures represent a 25 percent sample of all cases.

Note: Records of 14 children at the emergency room and 5 children at the health center were missing.

Location of the child's residence also influenced which facility the child visited. Children living outside the housing project were more likely to visit the emergency room than were children in the housing project, as the following table giving the percentages of visits by residence shows:

Residence	Emergency room (223 children)	Health center (799 children)
Housing project	41	58
Nonhousing project	58	42

Note: Records of 2 children at the health center were missing. Chi-square is significant at the .0001 level.

Race and residence location were not completely independent. Since most of the black children lived in the housing project and most of the white and Spanish-American children lived outside the housing project, it is difficult to discover the importance of each of the factors—race, ethnicity, and residence—in determining which facility was used.

The other variables studied revealed no meaningful patterns differentiating the two groups. Surprisingly, despite the fact that a visit to the emergency room costs \$14 while a visit to the health center is free, the types of coverage of costs were similar for both groups, as the percentages of visits by source of payment in the following table show.

Cost coverage	Emergency room (223 children)	Health center (189 children) ¹
Welfare, Medicaid	70	69
Blue-Cross, Blue-Shield, or Master Medical	11	8
Other	1	5
None	18	18

¹ Figures for the health center represent a 25 percent sample of all cases.

Note: Records of 11 children at the health center were missing. Chi-square is not significant at the .05 level.

Perhaps the fact that most children visiting either facility were covered by Medicaid might help explain this result.

To summarize, then, the results of our study indicate that the health center was used by almost four times as many children from the center's catchment area as used the emergency room and that the only factors which seemed to influence choice of facility were time, possibly race, and residence.

How then are the health center and the emergency room used? Over time, which patterns of use can be identified? To approach an answer, we identified the extent to which both of these facilities were used by these children during the more than 8-month period before the end of the study period. In so doing, we isolated four major categories of use: health center users who also used the hospital, health center users only, emergency room users also registered at the health center, and emergency room users only. Each of these categories of users presents a different profile and suggests a different pattern of use of health facilities.

Group 1—health center users also using the hospital (46 percent). Children in this group attended the health center during the study period. They also had used the hospital at some time in the past. This group can be categorized as using the health center for most of their needs while using the hospital as a subordinate source of health care. Of this group, 92 percent were registered at the health center before June 1, 1970, and 81 percent had used the hospital before this date. From June 1, 1970, until the conclusion of the study, these children (of those registered before June 1, 1970) averaged 5.1 visits to the health center, 0.7 visits to the emergency room, and 0.4 visits to the outpatient department of the Children's Hospital Medical Center.

Group 2—health center users only (29 percent). Children in this group attended the health center during the study period and never visited the hospital. These children showed two distinct patterns of use. Forty-seven percent had been registered at the health center after June 1, 1970; as such, they can be categorized as "center users—new." It is probable that in time they will assume the same pattern of use as the children in group 1 or as the remaining 53 percent of the children in group 2.

The remaining 53 percent of the children who had registered before June 1, 1970, visited the health center an average of four times from June 1, 1970, until the end of the study period. It is probable that the center represented the major source of their primary care. Whether these children used another hospital for some health care or whether they used only the health center cannot be determined from the data gathered in this study. This group, as does group 1, represents a stable group of patients in the health center.

Children in group 2 had the highest proportion of the youngest children, a larger proportion of Spanish-American children, and a smaller percentage of white children than any of the other groups. Most of them also lived outside the housing project. The new users described represent the large number of Spanish-American families who, as survey figures for 1971 show, are now moving into the area.

Group 3—emergency room users also registered at the health center (15 percent). Children in group 3 visited the hospital emergency room during the study period and were also registered at the health center. Most were not new users of either facility. Only 24 percent had first visited the hospital after June 1, 1970, and only 5 percent had been registered at the health center after that date. This group can best be categorized as "shoppers." Children in this group made an equal number of visits to the health center and to the hospital. From June 1, 1970, until the conclusion of the study period, those children in group 3 registered before June 1, 1970, averaged 3.3 visits to the health center, 2.7 visits to the emergency room, and 0.6 visits to the outpatient department.

There is little in the socioeconomic data to distinguish this group. Children of all races and ethnicities and children living inside and outside the housing project comprise this group to an almost equal extent.

Group 4—emergency room users only (7 percent). Children in group 4 attended the emergency room during the study period, but were not registered at the health center. Fifty-two percent had made their first visit to the hospital after June 1, 1970. The children in this group can be characterized as "low users." Of those who visited the hospital before June 1, 1970, an average of only 2.7 visits per child were made to the emergency room from this date until the end of the study period, and only 0.6 visits per child were

made to the outpatient department. This group contains the largest proportion of white children and nonhousing project residents of any of the four groups.

Despite the numerous problems we had with the typology just presented, it is clear that the majority of the children in the health center's catchment area used the center as their primary source of medical care (groups 1 and 2), using the emergency room only as a subordinate source of care. Less than 25 percent of the children used the emergency room to as great or greater an extent than they used the health center, and only 7 percent used it as a possible primary source of care exclusive of the health center.

Discussion and Conclusions

As noted, no effort was made to determine the attitudes of the children's parents toward each source of care. Data based on this type of information would probably have resulted in a more comprehensive discussion of why children went to one facility rather than another and of how each facility was conceived in the total pattern of care.

In the 1968 study by Salber and associates (6) of the attitudes of women residing within the Martha Eliot Health Center target area, almost 90 percent of the registered mothers said they were very satisfied with their children's care. Of those mothers not registered, 66 percent had heard of the center, and only three mothers made negative remarks about it. Our results seem to support Salber's conclusions that the health center has a favorable image in the community. These results do not, however, explain why some children continued to use other sources of care approximately 3½ years after the center had opened.

Certain limitations of our study should be noted. Possibly other facilities besides the Martha Eliot Health Center and Children's Hospital emergency room were used by the children studied. Certain evidence, however, does argue against this possibility. An unpublished study, conducted in October 1970 by Dr. Fredrick Berrien, a pediatric resident at Boston City Hospital, on the use of the emergency rooms at Boston City Hospital and Children's Hospital, revealed that almost all children from this area used the emergency room at Children's Hospital rather than the Boston City Hospital. In addition, the large number of

visits made to the health center and emergency room since June 1, 1970, by the children in our study indicates that it is unlikely that any other major source of care was used.

Another problem is that nothing is known about the use of medical services by children who did not visit either the health center or the hospital during the study period. Undoubtedly, many of these children used these two facilities as much as did the children in our study. The sample of children using the facilities during the 4-week period possibly contained a disproportionate number of "high users." The average number of visits made since June 1970 and even the characteristics of the children visiting each facility might not be representative of the population at each center.

It is not possible to judge what percentage of the eligible population never used either source of care and what, if anything, they used instead. The earlier studies cited indicate that this group is a minority, but its size at this time cannot be determined through this study.

Certain conclusions, however, are possible from the results presented. First, a health center can be accepted and used by the community. While evidence is not presented as to a decreasing use of traditional hospital-based services, our results do indicate that use of the existing health center dwarfs the use of the traditional hospital-based facilities. Thus, this health center, established partly to overcome the criticisms of traditional hospital-based service, has served to successfully attract persons to this new type of care.

The results also indicate areas in which certain measures taken by the health center might decrease the use of the emergency room and increase the use of the health center.

If the health center could be kept open for longer hours, some of the children using the emergency room might be able to come to the center. If the center were to remain open in the evening and all weekend, almost two-thirds of the emergency room patients could be seen at the Martha Eliot Health Center. But this would mean an average of only five additional patients an evening, a number which would hardly justify the additional expense of keeping the center open.

The health center staff might also reduce use of the emergency room by directing outreach efforts first to those children using the health center and the emergency room equally and second to those children using only the emergency room.

For the first group, a vigorous health education program could be designed. For the second group, an active outreach program among nonhousing project residents might encourage greater use of the center.

Examination of the records of the health center registrants at the hospital and conversations with physicians there have shown that often it was not known that a patient in the emergency room was registered at the health center. Even when this fact was known, a report of the visit was not always sent to the health center, nor was the patient always referred to the center for followup care. It appears that a coordination mechanism should be worked out between the different centers whose patients use the emergency room and the emergency room itself if continuity of care is to be accomplished. In addition, awareness on the part of the medical staff of such situations might informally improve the situation.

Although this study provided evidence that emergency room use could be reduced in several areas, the results support the assertion that among the children served by the Martha Eliot Health Center, use of traditional hospital-based facilities is minimal. This is a worthy achievement, given the criticisms raised about use of the emergency room as a primary care facility.

REFERENCES

- (1) Breslow, L.: New partnerships in the delivery of health services—A public health view of the need. *Am J Public Health* 57: 1094–1099, July 1967.
- (2) Bellin, S. H., and Geiger, H. J.: Actual public acceptance of the neighborhood health center by the urban poor. *JAMA* 214: 2147–2153, Dec. 21, 1970.
- (3) Solon, J.: Changing patterns of obtaining medical care in a public housing community: Impact of a service program. *Am J Public Health* 57: 772–783, May 1967.
- (4) Hochheiser, L. I., Woodward, K., and Charney, E.: Effect of the neighborhood health center on the use of pediatric emergency departments in Rochester, New York. *N Engl J Med* 285: 148–152, July 15, 1971.
- (5) Salber, E. J., Feldman, J. J., Offenbacher, H., and Williams, S.: Characteristics of patients registered for service at the neighborhood health center. *Am J Public Health* 60: 2273–2283, December 1970.
- (6) Salber, E. J., Feldman, J. J., Johnson, H., and McKenna, E.: Health practices and attitudes of consumers at a neighborhood health center. *Inquiry* 9: 55–61, March 1972.
- (7) Salber, E. J., Feldman, J. J., Rosenberg, L., and Williams, S.: Utilization of services at a neighborhood health center. *Pediatrics* 47: 415–423, February 1971.