Changes in Hospital Emergency Department Use Associated with Increased Family Physician Availability

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This study explores the effect of an increase in the family physician to population ratio on use of the hospital Emergency Department in a community. Two household surveys were conducted, the first before a community health center was established in an underserviced community, the second survey three years later. During this period there was a fivefold increase in the family physician-population ratio. Use of hospital Emergency Departments decreased. Respondents were more likely to have called their physician before going to the Emergency Department. If they did not call, the reason for not doing so was less likely related to physician unavailability. A decrease in the level of perceived illness in the community was also found.

This study was undertaken to determine the effects of establishing a community health center on selected aspects of the health care behavior of the residents of a medically underserviced community. This report presents some of the findings of the study, with particular emphasis on hospital Emergency Department use.

The study was undertaken to determine if an increase in the ratio of family physicians to population would lead to an altered pattern of hospital Emergency Department use. Would the utilization rate decrease? Would the type of problems taken to the Emergency Department be more likely acute? Would care from family physicians more often be sought prior to the Emergency Department visit? When respondents attended the Emergency Department without first trying to contact their physician, would the reasons be less often related to physician unavailability?

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The Community

In October 1972, a community health center was established in an urban neighborhood in metropolitan Toronto. This community had a population of about 10,000 people living in rented apartments and townhouses. About 15 percent of the dwellings were publicly subsidized housing units. Medical care provided within the community was confined to one family physician.

A building development in 1972 and 1973 added more apartments and townhouses, most of which were condominiums. In 1975, the community health center had been active for three years, with four family physicians, nurse practitioners, a social worker, a nutritionist, a laboratory, a phar-

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Table 1. Household Characteristics

Characteristic	Phase 1	Phase 2	Statistical Test
Mean number of persons per household	3.3	2.8	$\chi^2=1.62$, df=1, 0.25>P>0.1
Male:female ratio	49:51	45:55	$\chi^2=1.61$, df=1, 0.25>P>0.1
Age (years) % ≤17	33.0	35.0	
Age (years) % 18–45	58.0	52.4	$\chi^2=4.29$, df=2, 0.25>P>0.1
Age (years) % ≥46	9.0	12.6	
Marital status of adults % single	18.4	22.6	
Marital status of adults % married	72.9	67.1	$\chi^2=2.47$, df=2, 0.5>P>0.25
Marital status of adults % separated, widowed, divorced	8.6	10.3	

Table 2. Sociodemographic Characteristics

Characteristic	Phase 1	Phase 2	Statistical Test
Percentage with post-secondary school education	23.4	33.0	$\chi^2=.106$, df=1, .9>P>.75
Median family income	$9,932*	$11,454**	See *, **
Percentage in technical, professional, or managerial jobs	18.1	27.7	$\chi^2=7.7$, df=1, P<.01
Percentage Canadian born	55.4	45.1	$\chi^2=10.2$, df=1, P<.01
Percentage who have lived in community less than 1 year	35.1	35.9	$\chi^2=.04$, df=1, P>.9

*95% confidence interval ($7,615-$11,266)
**95% confidence interval ($10,363-$12,545)

macy, an x-ray unit, and a physiotherapy department. In addition, two private family physicians established practice in the community in 1973. A major physician-staff turnover occurred during the first six months of 1975. At this time three physicians left the health center and also set up practice in the community. The net result was a change from a physician to population ratio of 1:10,000 in 1972 to 1:1,800 in 1975.

The policy of the community health center, and also to a great extent the other medical groups in the community, was to provide extended hours of operation (70 hours per week), plus 24-hour physician coverage. A small emergency treatment room in the health center was provided with the aim of treating minor emergencies, thereby avoiding the necessity for some visits to local hospital Emergency Departments.

Methods

Two household surveys were conducted in the community. The first one, conducted in the summer of 1972, was completed just before the com-

Table 3. Use of Emergency Departments

	Number of Visits					
	0	1	2	3	4 or more	Total
Phase 1	363	82	13	5	3	466
Phase 2	426	54	11	2	1	494

$\chi^2=12.53$, df=4, $P<0.01$

munity health center opened. This is referred to as Phase 1 of the study.[1] The second was conducted three years later in the summer of 1975, and is referred to as Phase 2.

Phase 1 was a household survey of a randomized sample of addresses in the community. The interview schedule was administered by trained interviewers, in the respondents' homes. Out of a population of about 10,000 people, the sample consisted of 141 households, comprising 467 people. The representativeness of the sample was verified by comparison with 1971 census data.

The Phase 2 survey involved the same community but because of the large building development the population was estimated to be 18,000. The addresses selected for the sample in Phase 1 were used to make up the sample for one stratum in Phase 2, with the intention of obtaining a "before and after" measure of a subsample of respondents who had lived in the community at the same address from 1972 to 1975. A second stratum consisted of a random sample of the addresses in the new development. The first stratum consisted of 176 households, 494 individuals. This report presents data from Phase 1, and only the first stratum from Phase 2, so that comparisons are made using samples from the same addresses.

In order to view the findings regarding Emergency Department use in light of use in the broader community, data on total annual hospital Emergency Department visits were obtained from the Ontario Ministry of Health for the years 1972 and 1975.

Results

Sample Characteristics

A comparison of household sociodemographic characteristics in Phases 1 and 2, presented in Tables 1 and 2, show few changes. There is an increase in the proportion of foreign born persons. More people are employed in the professional, technical, and managerial occupations. The median family income was lower than that for the whole of metropolitan Toronto ($11,454) in Phase 1 but was proportionately even lower in Phase 2 (metropolitan Toronto median family income, $18,050).[2] The population continues to be mobile. Another indication of this is that the repeat sample in Phase 2 revealed only 5 out of the original 167 families in Phase 1.

Emergency Department Use

A marked difference was found in Emergency Department visiting rates. In Phase 1, 22.1 percent of respondents had visited a hospital Emergency Department at least once in the preceding one year; in Phase 2, 13.8 percent had visited ($\chi^2=12.53$, $P<.01$). Calculated on the basis of visits per 1,000 persons per year, in Phase 1 there were 280/1,000 persons per year; in Phase 2 there were 174/1,000 persons per year (Table 3).

There was essentially no difference between Phase 1 and Phase 2 regarding the acuteness of the problem for which the respondents visited the Emergency Department. The problem was reported to have begun within the previous 24 hours by 81.9 percent in Phase 1 and by 83.1 percent in Phase 2 ($\chi^2=.04$, $P>.9$).

During the two weeks before the Emergency Department visit, 13.5 percent of the visitors in Phase 1 consulted their physician about the same problem. In Phase 2, 19.4 percent had done so ($\chi^2=1.1$, $.5>P>.25$).

In Phase 1, 81.6 percent went directly to the Emergency Department; 18.4 percent attempted to contact their physician, then went to the

Table 4. Reasons Given for Going Directly to Emergency Department

Reason	Phase 1 (N)	Phase 2 (N)
It is the best place for the problem	30	4
*My doctor is unavailable/could not see me	22	12
*I have no doctor	13	3
*My doctor is too far away	9	1
My problem was a real emergency	6	18
*My doctor is ill/away	1	1
Other	1	4
Total	82	43

$\chi^2=22.8$, df=6, $P<.001$
*=reason related to physician unavailability

Emergency Department. In Phase 2, 35.8 percent attempted to contact their physician; 64.2 percent went to the Emergency Department directly ($\chi^2=65.4$, $P<.001$). Those who went directly to the Emergency Department were asked why they did not first try to contact their physicians. The replies are displayed in Table 4.

Reasons were then classified by those relating to physician unavailability (indicated by an * in Table 4), and other reasons. In Phase 1, 54.9 percent of reasons were related to physician unavailability, compared to 39.5 percent in Phase 2. Although specific reasons (ie, "I have no doctor" and "Doctor too far away") show differences from Phase 1 to Phase 2, the general comparison is of only borderline statistical significance ($\chi^2=3.63$, $.10>P>.05$).

Other reasons for these changes in patterns of Emergency Department use were examined. Perhaps the decreased visiting rate was part of an overall change in Toronto. More than half of the visits from this neighborhood were made to the three closest hospitals (58 percent in Phase 1 and 60 percent in Phase 2). In the three years between Phases 1 and 2, there was a 5 percent increase in the population of the municipalities in which these hospitals are located. During the same time period, there was, on the average, a 16 percent increase in the Emergency Department visits in these hospitals (range from 1 to 33 percent). This strongly suggests that, while visiting rate decreased in the study community, in the broader community the rate of Emergency Department use was increasing.

Could the changes be attributed to a change in the composition of the community? Only three of the sociodemographic variables, place of birth, occupation, and income changed from Phase 1 to Phase 2. Emergency Department use was unrelated to any of these variables.

Another possible reason for the decrease in Emergency Department utilization could be a difference in the amount of perceived illness between Phase 1 and Phase 2. Respondents were asked to report if they had felt ill during the two weeks preceding the interview. In Phase 1, 25.3 percent of respondents reported feeling ill compared to 14.2 percent in Phase 2 ($P<.001$) (Table 5).

This difference in perceived illness could easily account for much of the difference in rates of Emergency Department visiting.

In both phases, 60 percent of the "sick people" did not see a physician for their problem because it was not important enough (Table 6).

However, when other reasons were given, in Phase 2 these were less often related to physician unavailability than in Phase 1.

Strengths

This study gives the opportunity to study sociodemographic characteristics, perceived health

Table 5. Illness in Past Two Weeks

	Phase 1		Phase 2	
	N	%	N	%
Felt sick	118	25.3	70	14.2
Did not feel sick	349	74.7	424	85.8
Total	467	100.0	494	100.0

$\chi^2=18.8$, df=1, $P<.001$

Table 6. Reasons for Not Visiting Physician

Reason	Not Important	Physician Not Available	Other	Totals
Phase 1	22	12	3	37
Phase 2	6	2	6	14

$\chi^2=8.7$, df=2, $P<.025$

problems, and health care behavior over time. Of particular interest are the changes in health care behavior associated with an increase in family physician availability. It also gives an opportunity to examine population based Emergency Department utilization rates rather than utilization rates reported from hospital statistics.

Weaknesses

This study has the "weaknesses" of any survey research in that the data are derived from the subjects' opinions and recall and may not be entirely accurate. Since this research consisted of two surveys, three years apart, considerable attention was given to keeping the interview schedule and the research methods as nearly alike as possible. However, with change in research personnel and other unforeseen problems some differences occurred leading to areas of incomparability. Finally, although the study was originally designed to examine the effect on the community of the introduction of the community health center, many changes occurred in this community in the three years, including a near doubling of the population, and the addition of other physicians as well as those in the health center. Thus, there was great difficulty in separating the effects of the health center from other important factors.

Discussion

The ratio of family physicians to the population in the community increased from 1:10,000 to 1:1,800 with the addition of the community health center and of other family physicians to the community. This ratio is close to the overall Ontario ratio for 1961 to 1971 reported by Spaulding and Spitzer.[3] Clearly, the community in this study was medically underserviced in 1972, in Phase 1 of the study. Associated with this increase in family physician availability, per capita hospital Emergency Department visiting rate decreased by 40 percent. During the same period of time Emergency Department visiting rate increased in the broader community. This is similar to the findings of other investigators. Moore et al, who studied the effect of a neighborhood health center on Emergency Room visiting rates, observed that

the rates remained constant over two years in the study community, but the overall community rate rose during that time.[4] Hochheiser et al reported a 38 percent decrease in Emergency Room use by children in the community served by a neighborhood health center.[5]

An unexplained and confounding finding in the present study is a decreased illness reporting rate, which could account for all or part of the decreased visiting rate. The higher level of illness reported in Phase 1 could be accounted for by either "significant" illness or "trivial" illness. In both surveys the perception of the importance of the problems was the same. In Phase 1, however, respondents were more likely to use "physician unavailability" as a reason for not seeking medical care for their problems. It appears reasonable to suggest that family physician availability had an effect on the "seeking care" behavior in general of the study community.

Other findings, in any case, suggest that increased family physician availability had effects on health care behavior. There was an increase in the proportion of persons who contacted their physician immediately before the Emergency Department visit. This suggests that the family physician is more often playing a role in providing care for conditions perceived as urgent. Also seen is a difference in the reasons given by those who attended the Emergency Department without first contacting their physician. Reasons related to physicians' unavailability are less often stated. Emergency Department use was not related to measured sociodemographic factors, so changes in these could not account for the observed findings.

There are several likely reasons for the use of the hospital Emergency Department as an alternative to care in the family physician's office for urgent problems.[6,7]

First, hospitals have better developed and organized their Emergency Departments in the last 10 to 15 years. This is possibly a reaction to the increased demand, but at the same time has made the Emergency Department a more effective place to deliver a large volume of acute care. Secondly, supportive services, such as radiology, laboratory, consulting services, and hospital admission, if necessary, are easily accessible, certainly more so than in most family physicians' offices. Thirdly, even when a family physician takes calls in the "off-hours," the patient may not wish to bother the physician, or may fear the problem will be considered trivial. Immediate 24-hour availability can be offered in the Emergency Department, with no questions asked regarding the appropriateness of the visit. Fourthly, with virtually 100 percent of Canadians covered by health insurance, there is no financial deterrent to this rather expensive form of health care. Finally, some family physicians encourage the use of the hospital Emergency Department for urgent care of their patients' problems, not only during off-hours, but during the day, when close scheduling of patients may make it difficult to also deal with "unscheduled" problems.

Many family physicians, however, do offer care to their patients in "off-hours" and would prefer to look after all aspects of their patients' care, including urgent problems.[8] This study demonstrates that family physician availability does have an effect on the use patients make of local hospital Emergency Departments.

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