

# The Process of Ambulatory Care: A Comparison of the Hospital and the Community Health Center

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**Abstract:** In a study of 300 chronically ill patients who were referred from an outpatient department to community health centers in a public hospital district, we found that the number of visits made, the amount of medicine prescribed, and the number of tests ordered all increased markedly for those patients in the 6 months immediately following their referral. As a result, there was substantial increase in the charges incurred for their care. The care itself changed as well.

The physicians at the centers on the whole differed from those at the hospital in the emphasis they placed upon various types of visits, medicines, and tests. There were also large differences among the community health centers along these dimensions. The findings indicate the difficulty of providing comparable care at a comparable cost within a large health care system. (*Am J Public Health* 70:251-255, 1980.)

A major theme in many current proposals concerning health care is that a stronger emphasis on ambulatory services would result in better health for the population and lower expenditures for medical care. Although there may be more faith than fact supporting this claim, projections are that ambulatory services in general, and hospital-based ambulatory services in particular, are going to be asked to play a much larger role in the delivery of health services over the next several years.<sup>1</sup> Yet the hospital is seen as an expensive and overcrowded setting in which to provide ambulatory care. Therefore, alternative settings or arrangements which could extend the resources of the hospital are being sought. Among these are community health centers.

The extent to which community health centers can serve as alternatives to the hospital's outpatient department, especially for patients already under treatment at the hospital, depends upon the answers to three questions:

- Can the hospital's outpatients be successfully referred to community health centers?
- Can they receive comparable care there?
- What is the difference in cost?

Recently we reported our study in the Harris County Hospital District in Houston, Texas indicating that patients could be successfully referred from the public hospital to community health centers.<sup>2</sup> The present study addresses the remaining two questions.

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## Procedure

The Harris County Hospital District is a tax-supported public authority responsible for the medical care of the poor who live in Houston and the surrounding area. The District operates a network of facilities consisting of a general hospital, a specialized hospital, and eight community health centers. Baylor College of Medicine provides professional services for all these facilities.

Two outpatient clinics at the general hospital—Admitting and General Medical—were chosen as the sites for our study. In the General Medical Clinic, 55 physicians each maintain a panel of patients much as they would if they were in private practice. Admitting Clinic, which is staffed by three full-time interns, two part-time interns, and one full-time staff physician, is primarily for patients without appointments who present with acute conditions, but many patients are seen there by appointment for chronic conditions.

Six of the eight community health centers were involved in our study; of the two not involved, one was still under construction at the beginning of the project, and the other is so far from the hospital that it received few referrals. Typically, a center has two full-time attending physicians. These physicians hold faculty appointments at Baylor College of Medicine and, in addition to seeing patients, they supervise and evaluate the two to four medical students or residents at each center. The medical program at the centers is coordinated through monthly meetings of physicians from each center and the relevant boards and directors at Baylor. Community councils at each center play a strong role in formulating policies concerning non-medical matters.

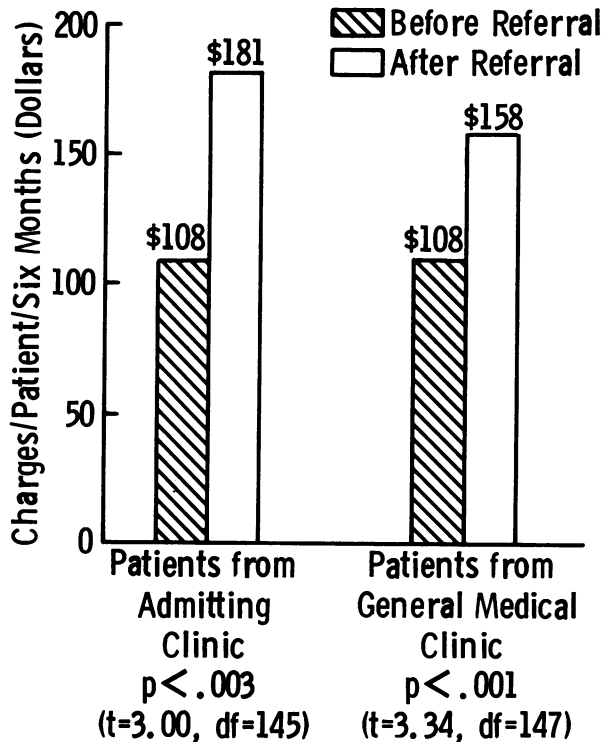


FIGURE 1—Changes in Visits (p values were obtained from the Wilcoxon Matched-Pairs Signed-Ranks Test)

Since May 1977, all charts in the General Medical and Admitting Clinics have been screened to identify patients who live nearer to one of the District's community health centers than to the District's hospital. The patients' physicians propose referral to the community health center to those for whom they believe it suitable. Patients who agree to referral are helped with transportation and appointments and their outpatient chart is transferred to the community health center prior to their first appointment there.

During the first nine weeks of the project, approximately 500 patients were referred from the Admitting Clinic and 300 from the General Medical Clinic. In January 1978, we began to examine the outcome of these early referrals. On the basis of our previous studies, we expected that 250 of the referred patients from each of the two hospital clinics would actually make the transfer. We chose to study 150 such patients from each hospital clinic and to stratify these samples by the community health centers to reflect the proportion of total patients referred to each center. Patients were selected at random until the quotas were filled.

To examine changes in the services received by the patients who transferred to the community health centers, we collected data concerning prescribed medicines, tests, and visits for two periods on each patient. The post-period consisted of the days between the first visit to the community health center and the date upon which we retrieved the record. We took the pre-period to be an equal number of days prior to the date of referral. Thus, the length of the studied periods varied from patient to patient. On the average, the pre-period and the post-period each consisted of 5.5 months.

Changes in the utilization of services undoubtedly affect the cost of providing those services, but true costs in the District have not been ascertained. Still, it is useful to have some common scale along which to measure changes in the visits, tests, and medicines involved in the care of the patients. We chose to use the charges for these services as such a scale, since the charges are the same at every facility in the District. When we speak of charges, we mean the so-called full charge for the services in question. Patients actually pay a portion of the full charge according to their financial circumstances, but the fraction they must pay remains the same regardless of the serving facility. An office visit, a given medicine, or a given test costs a patient the same amount at one of the community health centers as at the hospital.

We calculated the charges incurred by each patient assuming that all tests were performed in accordance with the physicians' orders recorded in the charts and that all medicines were taken in accordance with the frequency and length of time prescribed by the physicians as recorded in the charts. In cases of incomplete information concerning the amount of medicine given to a patient, the patient was assumed to have received the "usual amount dispensed" as reported by the District's pharmacists. This, too, is the same for all facilities.

All data concerning charges were positively skewed; therefore, for statistical analysis the data were transformed according to the formula  $\log(1 + x)$ .

## Results

Demographic characteristics of the two samples were as follows: General Medical Clinic—median age 62.9 years, 78 per cent black, 73 per cent female; Admitting Clinic—median age 54.2 years, 82 per cent black, 70 per cent female. All of the patients in the sample from the General Medical Clinic and 84 per cent in the sample from the Admitting Clinic had chronic diseases, usually hypertension complicated by other problems.

### Changes in Visits

To assess changes in the frequency of visits for primary care, we defined a "primary care visit" as one to a community health center, the Admitting Clinic, or the General Medical Clinic. In the pre-period, all of the visits for primary care were made to the hospital clinics; in the post-period, approximately 98 per cent of the primary care visits were made to the community health centers. As displayed in Figure 1, rate of visits for primary care increased after referral while rates of visits to the hospital's specialty clinics and emergency center decreased. The rate of hospitalization showed no significant change. Overall use of the District's facilities increased by 23.7 per cent for the sample from the Admitting Clinic and by 19.8 per cent for the sample from the General Medical Clinic.

The full charge for a visit to the community health centers or to any clinic at the hospital is \$12; the charge for a visit to the emergency center is \$25. We used these figures to calculate the average charge for outpatient visits per patient

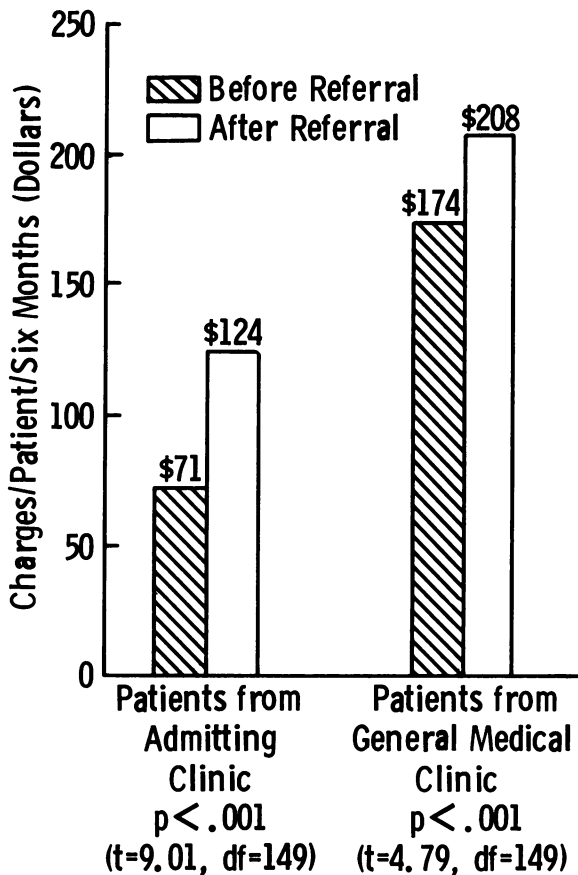


FIGURE 2—Changes in Amount of Medicine Prescribed

for six months. For the sample from the Admitting Clinic, the charge rose from \$65 per patient in the pre-period to \$78 in the post-period, a 20 per cent increase. For the sample from the General Medical Clinic, the charge rose from \$73 per patient to \$86, an 18 per cent increase.

In the pre-period, the majority of the visits were made at the request of the physicians: 84.6 per cent for the sample from the General Medical Clinic, 66.9 per cent for the sample from the Admitting Clinic. In the post-period, the percentage of visits initiated by the physicians was virtually unchanged for patients from the General Medical Clinic, but for patients from the Admitting Clinic, the percentage increased significantly to 76.5 per cent ( $X^2 = 19.5, df = 1, p < .001$ ). All of the increase in the number of visits in the post-period for the sample from the Admitting Clinic and most (72.5 per cent) of the increase for the sample from the General Medical Clinic are accounted for by visits initiated by the physician.

#### Changes in Amount of Medicine Prescribed\*

For the sample from the Admitting Clinic, Figure 2 depicts a 74.6 per cent increase in the mean charge for medicines per patient for 6 months. A strong positive correlation was found between a patient's charges in the pre-period and in the post-period ( $r = .64, p < .001$ ). To determine what accounted for the increased charges, we divided the medi-

cines into 18 pharmacological categories and compared the amount charged in each category in each period. We found that more was charged in every category during the post-period and that the increase in two of the categories—anti-hypertensive agents and non-narcotic analgesics—accounted for one-half of the overall increase in the charges for medicines. There were also striking increases in other categories: over four times as much in anti-infectives, over three times as much in gastrointestinal agents, and about twice as much in topical products, cold and cough medicines, and psychotherapeutic agents.

The mean charge for the sample from the General Medical Clinic increased by 19.5 per cent, as depicted in Figure 2. Again there was a strong positive correlation between a patient's charges in the two periods ( $r = .74, p < .001$ ). Charges were greater in 14 of the 18 categories with slight decreases in narcotic analgesics, hormones (excluding insulins), anti-convulsants, and anti-infectives. Increased charges in three of the categories accounted for one-half of the overall increase—anti-hypertensive agents, non-narcotic analgesics, and anti-diabetic drugs. The charges were approximately twice as great for gastrointestinal agents, topical products, cold and cough medicines, and psychotherapeutic agents.

The groups of patients sent to each community health center did not show any statistically significant difference from one another in mean charges for medicines in the pre-period, but they did differ in the extent to which charges for medicine increased in the post-period. For the sample from the Admitting Clinic, these differences were significant; percentage increases varied across community health centers from 35.7 per cent to 163.3 per cent (Kruskal-Wallis  $H = 11.65, p < .05$ ). When we looked at the use of medicines in certain categories, we found that the way in which usage changed from the pre-period varied markedly with the community health center to which the patients were referred.

#### Changes in Amount of Testing

In the sample from the Admitting Clinic, the mean charge for tests per patient for six months increased by 67.6 per cent, as shown in Figure 3. In this and succeeding statistical analyses,  $N$  is sometimes less than 150 because a few patients whose charges were greatly inflated by the timing of their tests were deleted from the analysis. No statistically significant correlation was found between a patient's charges for tests in the pre-period and those in the post-period.

To determine what accounted for the increased charges, we divided the tests into 10 categories and compared the charges in each category in each period. In every category except bone/joint X rays, charges were greater in the post-

\*In noting the charges described in this section and the one following, it is important to remember that the charges accrued in the post-period were not entirely attributable to the community health centers, although the latter facilities were by far the major contributors. It is also important to remember that the patients do not represent a random sample of the community health centers' clientele, but rather of patients referred to the community health centers who were already under medical care and by and large had chronic problems.

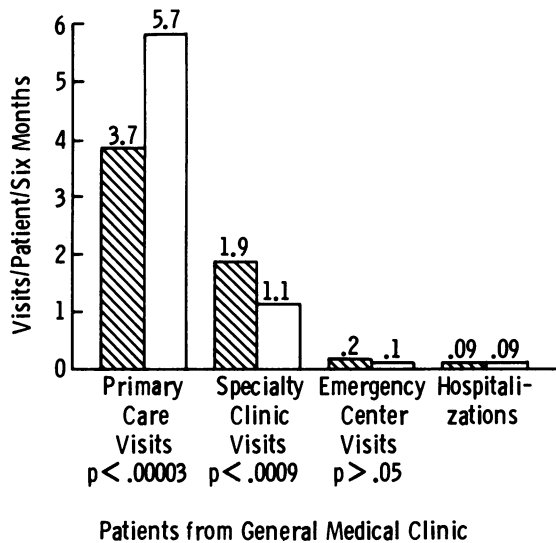
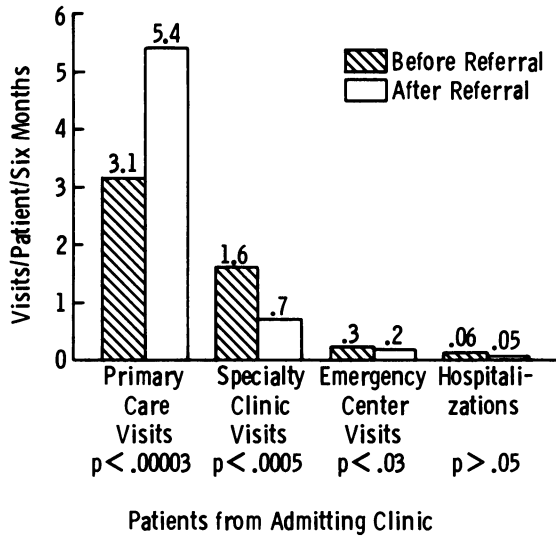


FIGURE 3—Changes in Amount of Testing

period. The increase in three categories—blood chemistry, electrocardiogram, and chest X ray—accounted for one-half of the increase in charges. In the post-period, there were six times as many smears/cultures, four times as many urinalyses, and twice as many chest X rays and electrocardiograms.

In the sample from the General Medical Clinic, the mean charge for tests per patient for six months increased by 46.3 per cent, as shown in Figure 3. No statistically significant correlation was found between test charges in the pre-period and the post-period. Charges were greater in the post-period in every category of tests except two—bone/joint X rays and scans/ultrasounds. The increase in three categories—blood chemistry, electrocardiogram, and chest X ray—accounted for almost two-thirds of the overall increase in charges for tests. In the post-period, there were six times as many urinalyses and smears/cultures, and twice as many chest X rays and electrocardiograms.

A major part of the charges for tests in the post-period was incurred on the patient's first visit to the community health center. Approximately one-half of the charges for the samples from both the Admitting Clinic and the General Medical Clinic arose from tests ordered for the initial work-up. Partly because the centers differ in the extent of their work-ups, and partly because the centers differ in the extent of their testing even discounting the work-ups, the charges incurred in the post-period as well as the rate of change from the pre-period to the post-period show a substantial variation across centers. For the sample from the Admitting Clinic, the rate of change ranged from -51.2 per cent to 228.6 per cent ( $H = 34.54$ ,  $df = 5$ ,  $p < .001$ ). For the sample from the General Medical Clinic, the rate of change ranged from -49.3 per cent to 153.1 per cent ( $H = 25.80$ ,  $df = 5$ ,  $p < .001$ ). The smaller variation across groups in the pre-period is not statistically significant. With regard to categories of tests, we found there was considerable variation across centers in the amount of testing done in each category.

### Discussion

Our measurements of the number of visits made, the amount of medicine prescribed, and the number of tests ordered indicate that, at least during the six months following transfer, the physicians in the community health centers applied many more medical resources to the care of the patients than did their counterparts at the hospital. The two groups of physicians differed as well in the relative emphasis they placed upon various types of visits, medicines, and tests. Of equal interest are the large differences among the community health centers along those dimensions.

To some extent, these findings may represent a temporary surge in the utilization of resources brought on by the patients' changing facilities. Temporary or not, however, these increases raise important issues of a general nature about the process of care.

*Visits:* Most research on frequency of visits for medical care has focused on characteristics of the patient. This focus needs to be shifted as is demonstrated by our finding concerning changes in the rate and type of visits made by the same patients when they moved to a different facility. Shortell also has shown that variables that have to do with the source of care are more important determinants of utilization than are variables that have to do with the patient.<sup>3</sup> As Kronenfeld has pointed out,<sup>4</sup> the process of utilization involves both the physician and the patient, and our finding that visits initiated by the physician accounted for most of the utilization and most of the increase in utilization gives evidence of the fundamental role of the physician in that process.

*Medicines:* Newly-discovered cases of such costly illnesses as hypertension and diabetes did not account for a significant amount of the increase in the use of medicines. Neither did patients who had been under treatment only a short time prior to transfer. Such patients did have a high increase (220 per cent), but the long-term patients also had a substantial increase (40 per cent). The overall percentage increase is more reflective of the experience of the long-term

patients since they were more numerous and their charges were considerably higher. In any case, this way of classifying patients was only possible for the sample from the Admitting Clinic; virtually all the patients in the sample from the General Medical Clinic were long-term.

It might be assumed that the increased use of medicines is due to the greater orientation towards comprehensive care at the community health centers than at the hospital. The General Medical and Admitting Clinics, however, are the most inclusive clinics at the hospital, and they are supported by over 60 specialty clinics whose pharmaceutical activity was included in the study. So, at least from the standpoint of charges if not style of treatment, the experience at the hospital should approximate comprehensive care. We believe, therefore, that the difference in the use of medicines has to do with the propensity to prescribe. Great variations in the use of medicines were found by Schroeder and his colleagues in their study of a group of similarly trained physicians treating a homogeneous group of patients.<sup>5</sup> In the present study, such variation is reflected, for example, in the large increases in the post-referral period in the amounts of medicines given for pain, colds, stomach aches, rashes, etc. Even for the major chronic problems, there were significant increases in the amount of medicines given. The differences among community health centers in the changes made in pharmaceutical care particularly highlight variations in patterns of prescribing.

*Tests:* The substantial difference among community health centers and between the centers and the hospital in the extent of testing echoes the findings by Freeborn<sup>6</sup> and by Schroeder, et al.<sup>5</sup> that there is tremendous variation in the use of laboratory procedures among physicians. Part of the variation in the present study is caused by protocols of health maintenance. In contrast to the physicians at the Admitting and General Medical Clinics, the physicians at the community health centers are expected to follow a plan which calls for certain tests at the initial visit and periodically thereafter.

As we noted earlier, however, there was considerable variability in the degree to which physicians followed the protocol in doing the initial work-up. In other words, what constituted the work-up varied. Still, such work-ups did account for a large portion of the post-referral charges for tests. It is possible that if we repeated our measurements one year after referral we would find fewer tests ordered per patient than during the first six months following transfer. Sussman, et al.<sup>7</sup> compared services provided to a cohort of patients in a newly established primary care practice with those provided to a matched cohort of patients in a traditional medical clinic. Initially the number of tests in the primary care setting was considerably higher, but over a period of three years, both groups had about the same number of tests. Considering the expense, however, the practice of routinely administering a standardized battery of tests warrants care-

ful consideration, especially for patients who have been under medical supervision already.

### Conclusions

When planners set a goal of providing comparable care at various sites within a health care system, two dimensions of comparability are likely to be prominent concerns: outcome of care and cost of care. The point at which planners can affect outcome is the process of care; however, the extent to which good outcome is *related* to good medical care (as opposed to chance, life-style, social support, natural course of the illness, etc.) may be small. Indeed, Hirschorn and his colleagues reviewed conditions reported by over a dozen settings for ambulatory care and found that a good outcome was related to good medical care in only 19 per cent of the cases.<sup>8</sup> Moreover, they found that only four per cent of the poor outcomes could be bettered by improving the process of care.

Although efforts to make the process of care comparable at various facilities may make little noticeable difference in outcomes, such efforts should make a noticeable difference in cost. As Fuchs has noted, since it is the physician who decides the quantity of service utilized, the physician is the principal point at which to direct efforts towards changing the process of care and thereby that part of the cost dependent upon process.<sup>9</sup> If physicians are to be the agents of change in making the cost of care comparable at various facilities—and that, a lower cost—they need to know what they and their colleagues are actually doing. Studies such as the present one can provide them with this information.

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