# Differences in the Outcomes of Acute Episodes of Care Provided by Various Types of Family Practitioners

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This study was designed to compare the outcomes achieved in a series of acute care episodes by different levels of family practice providers working in the clinic setting. The study utilizes a method which depends upon the provider to estimate level of function expected and earliest date of recovery for each episode. When the patients are viewed as a single group, those patients treated by the medex appear to fare considerably better and those seen by a faculty member do worse; however, when each functional status group is examined separately, only the asymptomatic but clinically ill patients (45 cases) show a statistically significant difference in outcomes among the providers, with the medex having good results and the faculty poor results.

The growing interest in primary care has created a climate in medical care circles reminiscent of the Oklahoma land rush. A variety of different types of specialists and generalists with differing levels of training and expertise have staked their claims on all or part of the territory. The influx of claimants has created substantial interest in the relative contributions offered by the various types of practitioners. Nowhere is this question more pressing than in the arena of family practice where the territorial imperative is already in evidence.[1]

At a time when the public is clamoring for more and better primary care, the need to develop individuals skilled in this discipline is particularly intense. While training programs in family practice are being established increasingly, others are experimenting with the use of nonphysician providers with success.[2]

The present study was designed to compare the outcomes achieved in a series of acute care episodes by different levels of family practice providers working in the clinic setting. Data for this analysis were drawn from a larger project designed to measure the outcomes of primary care.

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**Table 1. Functional Outcomes (Percent Good Outcome) by Provider According to Presenting Functional Status**

| Provider | Presenting Functional Status | | | | |
|---|---|---|---|---|---|
| | Illness | Asymptomatic of Activity | Symptoms but No Limitation of Activity | Limitation Homebound | Total |
| 1st year resident | 86 (7)* | 75 (176) | 80 (98) | 86 (14) | 77 (295) |
| 2nd year resident | 100 (8) | 75 (391) | 80 (246) | 70 (29) | 77 (674) |
| 3rd year resident | 62 (21) | 76 (223) | 76 (146) | 65 (17) | 75 (407) |
| Faculty | 33 (3) | 69 (147) | 73 (82) | 71 (7) | 70 (239) |
| Medex | 100 (6) | 87 (62) | 87 (73) | 80 (5) | 88 (146) |
| P value | < 0.05 | NS | NS | NS | < 0.005 |

*Number of cases shown in parentheses

## Methods

A series of 1,761 episodes of acute care rendered in two family practice centers associated with a university family practice residency program constituted the basic data. A detailed description of the study design is available elsewhere.[3,4] Each patient visiting either center for an acute problem during the nine-month study period (October 1974 to May 1975) was enrolled in the project. The subjects consisted of patients who presented with any acute complaint during that nine-month enrollment period. In order to focus on episodes of care which offered some possibility of producing change in function as a result of the physician's intervention, patients seen for follow-up of chronic problems without exacerbation or for general health maintenance were excluded. There were very few refusals to participate. Patients sufficiently ill to require hospitalization in the course of treatment (0.5 percent), patients who could not be reached for follow-up (eight percent), and patients who experienced a second, separate episode of illness before followup (six-percent) were excluded from the final analysis.

The providers consisted of 12 first year, 14 second year, and 11 third year family practice residents, nine attending physicians on the family practice faculty, and two physician's assistants. There was no turnover in this pool during the course of the study, although the participation of individuals could vary according to rotation schedule. During the study, the physicians treated their patients in the usual manner, and no attempt was made by the investigators to influence physician behavior. The physicians were informed about the study in advance, and a vigorous attempt was made to encourage their cooperation and minimize the time and paperwork required of them.

The outcomes of care were evaluated in terms of both functional status and patient satisfaction. The outcome measure used was based on a previously tested seven-level functional status index adapted from Williamson.[5] This index was designed to be sensitive to relative rather than absolute function. The levels approximated (1) full activity without symptoms, (2) presence of an underlying physical or laboratory abnormality without symptoms, (3) symptoms with full activity, (4) symptoms with restricted activity, (5) limitation of mobility, (6) confinement to bed, and (7) death. For analysis, a good functional or physiologic outcome was defined as one in which the patient's

**Table 2. Functional Outcomes for Selected Conditions by Providers Percent Good Outcomes**

| | Headache/ Malaise | Otitis | Pharyngitis | Upper Respiratory Tract Infection | Flu | Abdominal Pain | Rash | Neck/Back Pain | Cough |
|---|---|---|---|---|---|---|---|---|---|
| 1st year resident | 50 (8)* | 87 (16) | 72 (29) | 81 (57) | 87 (8) | 69 (16) | 60 (5) | 91 (11) | 61 (13) |
| 2nd year resident | 59 (27) | 78 (59) | 87 (70) | 73 (96) | 71 (21) | 68 (34) | 81 (16) | 72 (18) | 68 (37) |
| 3rd year resident | 47 (17) | 69 (35) | 86 (49) | 82 (38) | 83 (12) | 68 (22) | 70 (23) | 50 (14) | 74 (27) |
| Faculty | 40 (10) | 93 (14) | 81 (31) | 86 (22) | 100 (4) | 36 (11) | 80 (5) | 75 (8) | 82 (17) |
| Medex | 100 (1) | 100 (10) | 77 (13) | 92 (48) | 75 (4) | 60 (5) | 67 (3) | 50 (2) | 50 (2) |
| **Total** | 52 (63) | 80 (134) | 82 (192) | 81 (261) | 80 (49) | 64 (88) | 73 (52) | 70 (53) | 71 (96) |
| P value | NS | NS | NS | <0.1 | NS | NS | NS | NS | NS |

*Number of cases shown in parentheses

follow-up status was equal to or better than his usual status prior to illness. Patient satisfaction was separated into satisfaction with the care received and with the outcome; each was expressed in terms of the presence or absence of satisfaction.

Trained interviewers saw each patient upon arrival at the clinic to obtain demographic information and determine from the patient's reported activities the patient's usual functional status approximately six months prior to the clinic visit. Presenting functional status was also recorded to reflect the severity of impairment imposed by the current illness. After the appointment, the physician who saw the patient was asked to estimate the length of time necessary for the patient to receive the maximum benefit from treatment. At this projected time, the interviewer saw each patient again in his/her home to determine follow-up functional status and satisfaction. If necessary, the interviewer also performed any laboratory tests needed to complete the minimum data base or evaluate the effectiveness of treatment.

The costs for each episode of care were recorded to the nearest dollar both as total and by specific components (physician, laboratory, x-ray, and medication). Data on physician office visit costs and laboratory and x-ray fees were obtained from clinic and hospital billing records. All billings between the clinic visit and the scheduled follow-up date were included. Fees discounted for employees or welfare patients were recorded at the full usual charge. The physician fee schedule was competitive with local private providers, although all the physicians were paid on a salary basis which could not be influenced by the volume or quality of their work. Medication costs were determined from the prices charged in the adjoining hospital pharmacies for all medications prescribed by the physician, whether or not the prescriptions were filled.

The performance of providers was compared across five basic levels: the three years of residents, faculty, and other providers (in this case, medex). Cross-tabulations of data were analyzed by the chi-square method with a level of statistical significance set at $P<0.05$. The cost data were compared by a one-way analysis of variance.

## Results

A comparison of functional outcomes achieved by the various levels of providers is shown in Table 1. Here the data, expressed as percentge of good outcomes, are stratified according to the patient's functional status at the time of his first visit for the episode of care. Because the study dealt with patients presenting with acute problems, there were none with a presenting functional status of one (asymptomatic), but there were a group who were found to have problems in the absence of symptoms (functional status two). The few bedridden patients were combined with functional status five (confined to home).

When the patients are viewed as a single group, those patients treated by the medex appear to fare considerably better and those seen by a faculty member do worse. However, when each functional status group is examined separately, only the relatively small group of asymptomatic but

**Table 3. Patient Satisfaction by Level of Provider**

| Provider | With Care % | With Outcome % | N |
|---|---|---|---|
| 1st year resident | 94 | 90 | 295 |
| 2nd year resident | 96 | 89 | 674 |
| 3rd year resident | 97 | 90 | 407 |
| Faculty | 97 | 88 | 239 |
| Medex | 98 | 95 | 146 |
| P value | NS | NS | |

clinically ill patients shows a significant difference in outcomes among the providers, with the medex (six cases) having good results and faculty (three cases) poor results. For the other functional status categories no significant differences were found, although the medex had the best or near best outcomes in each instance.

The differences among the providers are less clear when the functional outcomes are examined for selected conditions. Table 2 presents these data for those conditions for which at least 50 cases were collected. In none of the cases was a statistically significant difference among the providers found. Nor was there any clear pattern of superior outcomes for any one level of provider across the conditions studied.

Table 3 compares another measure of outcome—patient satisfaction. The data are presented in terms of the percentage of patients expressing satisfaction with the care they received and with the outcome of that care. For each level of provider the proportion of patients satisfied with the care is greater than that for outcome. In neither case, however, is there any significant difference among the providers.

The average cost of an episode of care is shown in Table 4. These costs have been subdivided into three principal components: the clinic charge (a relatively fixed charge per visit to cover the provider's services and general related expenses), charges for laboratory and x-ray tests, and the costs of medications. Because the clinic charge was the same regardless of the type of provider, it can be viewed as an indirect indicator of the number of visits per episode. (However, there were exceptions to this when individual providers might alter the fee charged for return visits.) The total cost per episode varied over a range of $4, with medex the most expensive. Once again, no clear pattern emerges, but some observations can be made. Faculty tended to use significantly more laboratory tests and less medication. The medex were the next highest users of the laboratory and the highest users of medications.

Another type of comparison among various types of providers is possible for a subset of cases. Standards of care based on more traditional process criteria for diagnosis and management had been developed and pretested by the Utah PSRO (professional standards review organization) for a limited number of ambulatory care complaints. This approach is based on identifying deficiencies from a desirable level of care. A subset of 251 cases from the outcome study was identified which fell into these categories. Table 5 presents the deficiency rate for each provider type. Although the number of cases for any one disease or provider type was small, the medex appears to do about as well as any other provider type.

## Discussion

In the training situation one tends to view the faculty as the role model. A priori one might expect to see a pattern of gradual progress across the three years of residency to increasingly approximate the faculty's performance. This was not the case. The faculty's performance was not consistently better than that of the residents nor did more senior classes of residents perform consistently better than their more junior colleagues, by these criteria.

It must be kept in mind that this is a cross-sectional study which compares different cohorts of providers at one period in time rather than following a single group over an extended period to document the maturation of their skills. Nonetheless, the anticipated difference in performance levels was not demonstrated.

One explanation of the lack of difference is the observation that the various types of providers do not actually work independently. The residents and the medex have the benefit of faculty supervi-

**Table 4. Mean Costs (in Dollars) per Episode of Care by Provider Type**

| Provider Type | Total | Physician Fees | Laboratory | Medication | (N) |
|---|---|---|---|---|---|
| 1st year resident | 21.67 | 12.99 | 4.90 | 3.08 | 294 |
| 2nd year resident | 19.25 | 12.23 | 3.40 | 3.33 | 669 |
| 3rd year resident | 20.87 | 12.84 | 4.51 | 3.48 | 402 |
| Faculty | 21.72 | 12.82 | 6.31 | 2.40 | 239 |
| Medex | 23.52 | 14.37 | 5.24 | 3.60 | 143 |
| P value | NS | NS | .04 | .004 | |

sion. The data suggest that the faculty may in fact pay closer attention to the cases for which they are responsible as teachers than those for which they are the primary providers of care.

Another possible explanation for the lack of difference could be case selection. It might be argued that the more advanced practitioners saw the more difficult cases. However, when the outcomes were examined by presenting functional status and by the various conditions, no pattern of improved results with seniority was evident.

The outcome of an episode of care with the technique used here is highly dependent on the time of follow-up set by the physician. It is possible that a physician predicting a quick recovery might produce a less optimal outcome because the follow-up visit was premature. To guard against this possibility, the follow-up visits were not scheduled any sooner than two weeks after the first visit for the episode and could take place as much as six months later.

The relatively poor outcomes on many self-limiting entities were in part due to the presence of laboratory abnormalities. A persistently positive throat culture, for example, suggests poor patient compliance. Although the symptoms subside, an underlying abnormality persists. The patient thus shows an improvement over his presenting functional status but does not return to his usual status and is classified as a poor outcome. However, we must also recognize the possibility that the patient's condition has been misdiagnosed. A perceived self-limited disease may in fact be something more serious.

When the process of care for a given set of complaints is examined using traditional criteria for good care developed by the practicing medical community, the same pattern seen with the outcome data holds — relatively "poor" faculty performance, "good" medex performance, and "no evident progression" through the levels of the residency program.

Certain limitations to the data must be recognized. The numbers of cases for any detailed analysis are small; the results presented here are therefore intended as suggestions rather than clear-cut conclusions. Much of the information on patient status depended upon self-report by the patient. No means of assessing the psychosocial component of the illness or the patient was available. Within a given diagnostic category or even a functional status category, some variation could occur which might be lost by the relatively gross measures used. Finally, the study was limited to acute conditions only and thus does not represent the full spectrum of primary care with its heavy emphasis on chronic illness and health maintenance.

**Table 5. Mean Number of PSRO Deficiencies for Various Diagnoses by Provider**

| Diagnosis | Criteria per case | Residents 1st year | Residents 2nd year | Residents 3rd year | Faculty | Medex |
|---|---|---|---|---|---|---|
| Otitis media | 14 | 2.3 (14)* | 3.1 (45) | 3.0 (27) | 2.7 (8) | 2.6 (8) |
| Hypertension | 35 | 10.2 (5) | 4 (1) | - | - | - |
| Pharyngitis | 15 | 3.3 (10) | 5.7 (23) | 4.5 (15) | 6.4 (18) | 3.4 (7) |
| Tonsillitis | 15 | 2.7 (4) | 1.7 (3) | 2 (3) | 2 (1) | .5 (2) |
| Urinary tract infection | 37 | 12.3 (3) | 12.2 (6) | 9 (1) | 17 (1) | 13 (1) |
| Bronchitis | 9 | .2 (6) | .7 (9) | .2 (9) | .1 (7) | - |
| Vaginitis | 5 | 1 (2) | 1.2 (6) | 1 (3) | - | 1.3 (3) |

*Number of cases shown in parentheses

The data are clearly drawn from a training setting which it may not be possible to directly extrapolate to practice. However, when this same general technique was applied to compare the performance of medex and their private practice preceptors, similar results were obtained.[6]

Nonetheless, these data raise a set of important, if perplexing, questions about the training of family physicians. If, as the data suggest and other studies bear out,[7-9] a large bulk of primary care can be provided with equal effectiveness by both physicians with different training levels and nonphysicians, are we emphasizing the appropriate skills in our training programs? The experience represented here indicates, for instance, that family practice faculty and residents do not think in terms of patient prognosis at least for acute episodes. In a sphere in which emphasis is placed on meeting the needs of the whole patient, it seems particularly appropriate to develop a sensitivity to assessing the patient, setting realistic treatment goals, and planning deliberately for ways in which progress can be ascertained.

We would suggest that this study adds to the growing body of literature calling for a closer analysis of what truly constitutes family practice. This implies much more than a simple description of the overt reasons why patients visit a physician. It requires a new taxonomy[10] and a series of analytic investigations into the process of family practice — what is truly being sought, what is offered, what difference does it make, how can we accurately assess the expected outcome of a case at the time the patient presents himself for care. This offers a rich research agenda for the family practitioner, which should leave little doubt about his rightful claim to this poorly charted area.

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