Measuring Continuity of Care in a Family Practice Residency Program

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While the significance of continuity of care in medical practice has not yet been completely assessed, this concept has been espoused by the new specialty of family practice along with some other specialties. It is an integral component in family practice residency programs. The purpose of this paper is to identify several methods of measuring continuity of care in a residency setting and to demonstrate their application. Measurements called COC (Continuity of Care) and UPC (Usual Provider Continuity) will be described as they apply to overall patient visits, visits for chronic conditions, and visits by family members.

Continuity of Care is a phrase much in evidence in this day of emphasis on "primary care." Those who advocate family practice generally feel that continuity of care is one of the significant contributions of the family physician.

Although continuity of care seems intuitively to be desirable, all studies have not shown this to be the case.[1-5] Indeed, certain studies show that patients themselves see no advantage in continuity of care.[5-8] Some have even speculated that perhaps continuity of care is counterproductive and that medical care is improved when a number of different providers are involved with a single illness.

On the other hand, there is much evidence to show that continuity of care is, in fact, desirable[9-17] and that patients do prefer it.[14]

Continuity of care has several different meanings. It usually refers to seeing the same physician over a period of time. However, it can also mean receiving care in the same location and having a single medical record. A further breakdown might categorize the number of physicians seen for a single spell of illness. Additional measures of continuity of care might involve the rate of complete immunization, the number of hospitalizations supervised by the regular provider, and the number of family members seeing the same physician.

If attaining continuity of care is a desirable goal, it follows that teaching continuity of care is important in physician training, especially for those physicians who will be involved in primary care. As a matter of fact, approved family practice residency programs are required to provide such training. Model offices have been implemented as a means to this end.

But is continuity of care a reality in model offices? How can it be measured? What steps can be taken to ensure that it is practiced as well as talked about?

This paper presents several simple ways to quantify continuity of care. The hope is that methods such as these will focus attention on levels of continuity of care and will provide means for comparison.

Table 1. Number of Visits and Physicians Seen by 72 Patients over a Three-Year Period

| Number of Visits | Physicians Seen | | Number of Patients | COC* for the Group | UPC** for the Group |
	Mean	Range			
1-5	2.72	1-5	25	0.428	0.59
6-10	4.43	2-7	23	0.188	0.41
11-15	6.67	3-10	11	0.228	0.45
16-20	6.75	6-8	4	0.195	0.37
21-25	8.75	5-15	4	0.244	0.42
26-30	9	—	1	0.256	0.41
31-35	9	4-14	2	0.499	0.66
36-40	9	6-12	2	0.232	0.40
Total Number of Patients			72		

Average COC for the Group of 72 — 0.205
Average UPC for the Group of 72 — 0.46
Average Visits per Patient over Three Years — 9.9
Average Number of Different Physicians Seen per Patient in Three Years — 4.93

$$*COC = \frac{\text{Sum of (visits to each MD)}^2 - \text{Total number of visits}}{\text{Total number of visits (Total number of visits} - 1)}$$

This emphasizes the number of times each MD was seen and also the number of different MDs seen

$$**UPC = \frac{\text{Number of visits to the most frequently seen MD}}{\text{Total visits by the patient}}$$

This focuses on the frequency of visits to one MD but gives no indication of the total number of MDs seen by the patient

Methods

Originally, it was planned to study patients assigned to first year family practice residents and to follow them over the three-year period of the residents' training. The plan was to see how well the patients confined their model office visits to the assigned residents. It soon became apparent that it was too difficult to really identify which patient was assigned to which resident.

It was then decided to shift the focus of investigation from how well a resident followed his assigned patients to how many different physicians an average model office patient sees in a course of three years.

Seventy-two patients were selected for study. These were patients seen by a cohort of first year family practice residents soon after the beginning of their practices in the model offices of a family practice residency program. Aside from that stipulation, the patients were selected at random.

The charts of these 72 patients were examined. Each office visit with the name of the physician seen from July 1975 to June 1978 was tabulated. The visit history of the patient was then depicted by a series of integers. The number of integers represented the number of different physicians seen over the three-year period and the value of each integer represented the number of visits to an individual physician.

Table 1 divides these patients according to the number of visits they made in three years. For each "number of visits" category, the mean and range of the number of physicians seen are shown. Also, the number of patients making this number of visits is displayed. Next, the table lists a COC (Continuity of Care) number for each group. COC is defined as:

$$\frac{\text{Sum of (visits to each MD)}^2 - \text{Total number of visits}}{(\text{Total number of visits}) \times (\text{Total number of visits} - 1)}$$

Table 2. Continuity of Care in Families							
Family Members Seen	Number of Such Families	Physicians Seen		Total Visits per Family		COC	UPC
		Mean	Range	Mean	Range		
2	20	7.25	2-13	16.6	2-50	0.289	0.40
3	13	8.77	4-16	17.6	4-40	0.106	0.30
4	8	11.90	8-18	26.6	16-38	0.129	0.29
5	3	13.00	8-19	32.0	29-37	0.135	0.28
6	1	12.00	—	14.0	—	0.002	0.14
7	2	14.00	12-16	38.5	38-39	0.147	0.33
8	1	21.00	—	78.0	—	0.071	0.17
Total Number of Such Families	48						
Average COC for All Families						0.145	
Average UPC for All Families						0.314	
Average Number of MDs Seen per Family in Three Years						9.6	
Average Number of Visits Made per Family in Three Years						20.58	

This COC ranges from a possible 0 to a possible 1. It is affected by the number of times an individual physician is seen but also by the total number of physicians seen. In order to have a COC score of 1, the same physician must be seen for each visit. A different physician each time gives a score of 0. A large number of different physicians seen will give a low score even though a single physician was seen repeatedly.

In addition, Table 1 lists the UPC (Usual Provider Continuity) for each group. This measure is simpler than the COC and is defined as:

$$\frac{\text{Number of visits to the most frequently seen MD}}{\text{Total visits to all MDs}}$$

A visit to the same physician each time gives a score of 1 but, unlike the COC, a score of 0 is impossible. This measure is not as sensitive to the number of physicians seen as is the COC.

A further step was to identify all of the family members of the cohort of 72 patients who were enrolled as patients in the practice during the same three-year period. The office visits of these 108 family members were enumerated as the visits of the original 72 had been. Forty-eight family groups with two or more members enrolled in the practice were identified. Table 2 displays the number of different physicians seen according to the number of family members seen. Each group also shows the number of visits by the family and the COC and UPC scores for the family. Theoretically, if all family members saw the same physician for all their visits, the family COC and UPC would be 1.

Finally, out of the group of 180 patients, 17 were found with a diagnosis of hypertension. Table 3 provides a further breakdown of these patients by number of visits.

Table 4 is a summary of the continuity of care for different groups over a three-year period.

Results

72 Patients

In the group of 72 patients selected for study, it is obvious that the average patient had encounters with numerous physicians over the three-year period of the study. At least one of these patients saw 15 different physicians in the same model office. The average patient made 9.9 visits in three years and saw 4.93 different physicians. It is interesting to note that although the UPC for the group was 0.46, the COC was a low 0.205. The latter figure reflects the large array of different physicians seen by many patients while the UPC shows that, indeed, many patients had a "Usual Provider" whom they saw more than the other physicians.

Table 3. Continuity of Care in Hypertensive Visits

Number of Visits	Number of Patients	Physicians Seen		COC for the Group	UPC for the Group
		Mean	Range		
1-5	10	1.8	1-4	0.527	0.79
6-10	5	4.6	2-6	0.236	0.44
11-15	0	—	—	—	—
16-20	1	3.0	—	0.758	0.88
21-25	1	10.0	—	0.103	0.22

Total Number of Patients   17

Average COC for the Group of Hypertensives	0.43
Average UPC for the Group of Hypertensives	0.63
Average Number of Visits per Patient	6.41
Average Number of Different Physicians Seen per Patient	3.17

Table 4. Summary of Continuity of Care over a Three-Year Period

Measure	72 Individuals	48 Families	17 Hypertensives
COC	0.21	0.15	0.43
UPC	0.46	0.31	0.63
Average Number of Physicians	4.9	9.6	3.2
Average Number of Visits	9.9	20.6	6.4

48 Families

The results show an increase in number of physicians seen with increase in family size. At least one family saw a total of 19 different physicians during the three years. Indeed, the average family made 20.58 visits to the model office and saw 9.6 different physicians. Again, however, it can be seen that many families had a "Usual Provider," of sorts, which accounts for a UPC over twice the COC.

17 Hypertensive·Patients

Almost ten percent of the group of 180 family members were diagnosed as having hypertension. This provided a chance to evaluate continuity of care in a chronic illness. These visits were for hypertension and do not represent all of the visits by the hypertensive subgroup. In such a group one would expect a better level of continuity of care.

This is borne out by a COC of 0.43 and a UPC of 0.63. For hypertensive visits, an average of only 3.17 different physicians were seen per patient. Comparing this with the average number of visits for hypertension (6.41) shows that the average hypertensive patient saw a new physician on every other visit (6.41/3.17 = 2.02).

Discussion

If continuity of care is important, then its measurement is also important. It seems all too easy to espouse the principle of continuity of care and then fail to carry it out in actual practice. Surely, this must teach the resident physician that continuity of care is either unimportant or too difficult to attain.

Probably, the family practice residency is one of the more difficult settings in which to practice continuity of care.[18] The family practice resident

must rotate on a number of different services in a hospital usually remote from his model office. His time in the office is very limited, and when he is tied up in a distant hospital it is all too easy to shunt his patient to one of the other residents in the office. This may be necessary because of the acute nature of a problem, but in practice the patient is shunted probably more often because continuity of care is not emphasized. The patient is not made fully aware that he has a personal physician. The receptionist has not been vigorously instructed to channel patients to their personal physician. The residents themselves have not been inculcated with the principle of continuity of care, and, finally, administrative machinery has not been set up to better implement continuity of care.

One approach to emphasizing continuity of care is to periodically evaluate it in the practice. Formulas for doing this are now available. Earlier formulas including CON and GINI have been described elsewhere.[19] A measure called LICON attempts to quantitate the degree of continuity of care which is present over and above that which would occur by chance. SECON attempts to measure continuity of care as demonstrated by the number of sequential visits.[20]

The COC formula was developed by Bice and Boxerman and seems to be a valuable addition to the measurement of continuity of care.[21] This seems especially valuable in a residency setting where a large number of potential providers are available. Since this formula is sensitive to the number of physicians seen as well as to how often they are seen, it gives a fairly comprehensive measurement of the degree of continuity or the lack of it. The simpler UPC is easier to conceptualize and use but has the disadvantage of not emphasizing the number of different physicians seen. It is the parameter used in a recent report from the family practice residency program at the University of North Carolina. Their conclusion was that a UPC of 70 to 80 percent for individuals and 60 to 70 percent for nuclear families was possible.[22]

The continuity of care reported in this paper is distressingly low, especially when compared with the report from North Carolina. However, the measurement of this continuity (or discontinuity) of care has alerted this department to the need for changes and it is hoped it will be the means of improving the approach to this subject.

The more widespread use of measurements of continuity of care, especially utilizing COC and UPC, will enable comparisons and will facilitate focusing on an area which most family physicians feel is essential to good health care.

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