A large part of the population of the United States receives medical care on an ambulatory basis through institutional facilities. But how do the patients get to them? To study the problem of referral to clinics, the authors of this report developed a methodology which they discuss here.

A STUDY OF PATTERNS OF PATIENT REFERRAL TO A MEDICAL CLINIC IN A RURAL STATE: METHODOLOGY

Leon P. Andrews, M.D.; Earl Diamond, Ph.D.; Kerr L. White, M.D.; T. Franklin Williams, M.D.; Bernard G. Greenberg, Ph.D., F.A.P.H.A.; Aileen A. Hamrick, M.S.W.; and Ester A. Hunter, M.A.

ABOUT 83 million outpatient visits are made annually to the 5,500 hospitals in the United States which provide some form of ambulatory patient care.[1] The remarkable growth and utilization of outpatient facilities since the opening of the first dispensary in 1696[2] is tangible evidence that institutional ambulatory medicine is an important element in the provision of medical care. Until recently little has been done to evaluate critically the role of outpatient departments in the over-all patterns of medical care,[3] or to devise methods for improving the availability and quality of ambulatory services.[4] Michael Davis[2] and Richard Cabot[5-7] reviewed these problems 50 years ago and today it is difficult to document significant advances toward their solution.[8-10]

Odoroff and Abbe[11] provide important ecologic data on the utilization of outpatient departments by various segments of the population, but meaningful data about the need for different types of services, the process of referral, and the quality of outpatient medical care are largely lacking. Recently, the precise nature of the expectations and attitudes of patients and physicians in outpatient departments has become the object of careful investigation.[12-15] In urban communities, where the outpatient department may act as the family physician, the process by which patients select or are referred to such a clinic is also being studied.[16]

For rural areas no data about the referral process or the role of a university clinic are available. A study designed to supply such information has been undertaken in the General Clinic of the North Carolina Memorial Hospital (NCMH) at the University of North Carolina,[17] a clinic which provides comprehensive diagnostic and consultant services for ambulatory patients referred by physicians in the eastern two-thirds of a predominantly rural state. Except in cases of emergency and occasional self-referral, patients are seen by appointment and have a thorough work-up

by a senior medical student or house officer and a staff preceptor. Each patient is usually seen at least twice in the clinic. Thereafter, treatment may be continued by the clinic and one of its subspecialty sections or the patient may be returned to his referring physician. Ultimately the care of each patient reverts to his referring physician. In contrast to many urban outpatient departments the clinic makes no attempt to provide continuing medical care for any save a few patients in two small demonstration teaching programs.

The present report describes the design of a study which attempts to answer the following questions: (1) What are the characteristics of the physicians who refer patients to a university outpatient department in a rural state? (2) What are the characteristics of the patients and their clinical problems? (3) For what reasons are referrals made? (4) Who initiates the referral: the patient, physician, or some other agency? (5) What problems are encountered in making appointments and in the arranging transportation, housing, and meals? (6) What are the physician's and the patient's expectations about the outcome of the referral? (7) What are the overall costs of the referral for the patient? (8) How effectively does the clinic communicate its information to the referring physician and patient and what is done with it?

The design of a study employing interviews to answer these questions proved a complex task; this discussion of the problems encountered may be of value to others contemplating similar studies of medical care. The results of this investigation will be the subject of future reports.

Analysis of Populations to Be Studied

The aims of this investigation made it necessary to study samples of both physician and patient populations represented in the records of the clinic. For convenience, the physician sample was made the primary one and the patient sample was based upon it.

In analyzing the physician population, three steps were necessary: (1) the definition of the limits of the geographic area to be studied; (2) the compilation of a list of all physicians in this area and information about the number of patients each referred to the clinic in a specified reference period of time; and (3) stratification of the physician population according to the variables which might affect significantly the patterns of referral.

With the needs of this study in mind, complete records of referrals to the clinic, classified according to the individual physicians or agencies responsible, were kept from January, 1956. A full year's experience was available for use in early 1957. Clinic records and other sources (see Appendix) furnished the data for a table indicating for each county the total number of practicing physicians, the number of agencies referring patients to the clinic, and the number of patients from each source. From this table a map (Figure 1) was prepared showing by counties the percentage of physicians referring patients to the General Clinic in 1956. With this information the study area was defined as that portion of the state to the east of the heavy line shown on the map. The relative rates of referral from the two geographic areas are shown in Table 1. The western area included 11 per cent of the population of the state and 45 per cent of the physicians but furnished only 6.3 per cent of the patients referred to the General Clinic and included only 8.2 per cent of the physicians making such referrals.

The following categories of physicians were excluded from the study: physicians not in active practice, interns and residents, physicians in government service, physicians on the staffs of state hos-

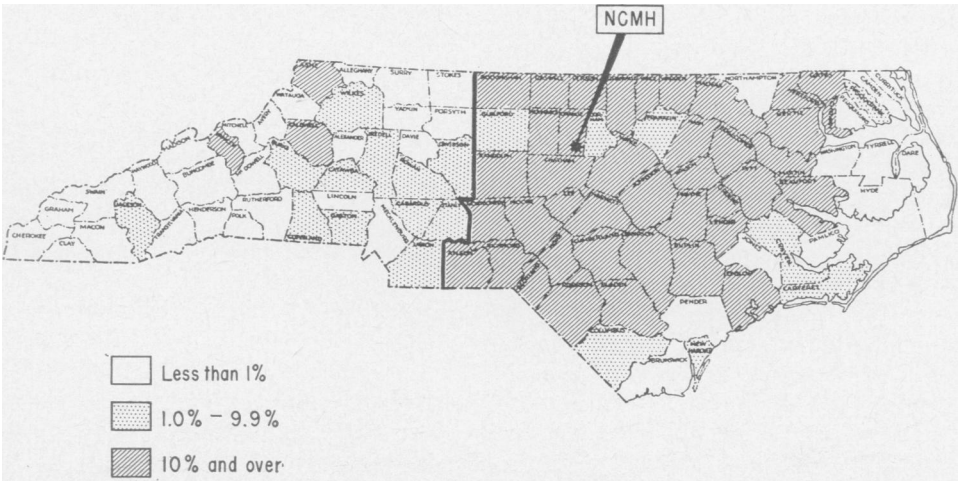

Figure 1—Per cent of Physicians Referring Patients to NCMH General Clinic in 1956—by Counties

pitals for tuberculosis and mental illness, physicians on medical school faculties, physicians for whom adequate data were lacking, and 14 physicians interviewed during the pretest period. This left a total of 1,491 physicians in the base population.

The variables which were considered most likely to affect the physicians' referral patterns were: distance from North Carolina Memorial Hospital, type of practice, size of local community, age, race, and prior association with the University of North Carolina. Data on these points for each physician were obtained from several sources (see Appendix).

Table 2 shows the frequency distribution of physicians in the study area according to the number of referrals in 1956. On this basis, physicians were divided into three groups: (1) those who referred no patients; (2) those who referred one or two; and (3) those who referred three or more. Subsequent tab-

Table 1—Number of Referrers and Number of Patients in NCMH General Clinic in 1956 by Type of Referrer and Area of State

Type of Referrer	Study Area		Western Area		Entire State	
	Referrers	Patients	Referrers	Patients	Referrers	Patients
Physician	337	823	30	40	367	863
Public Welfare Dept.	24	113	5	15	29	128
Vocational Rehabilitation	14	52	4	22	18	74
Health Department	15	23	0	0	15	23
Self	. . .	129	. .	6	. . .	135
Within NCMH	. . .	117	. .	2	. . .	119
Miscellaneous	8	12	0	0	8	12
Unknown	. . .	2	. .	0	. . .	2
Total	398	1,271	39	85	437	1,356

Table 2—Number and Per cent of Physicians in Study Area by Number of Referrals to NCMH General Clinic in 1956

Number of Referrals	Number of Physicians	Per cent of Physicians
0	1,188	79.7
1	161	10.8
2	58	3.9
3	28	1.9
4	19	1.3
5	13	0.9
6	3	0.2
7	4	0.3
8	1	0.1
9	3	0.2
10	3	0.2
Over 10	10	0.7
Total	1,491	100.2

ulations were made with the number of referrals as shown in these three groups representing the dependent variable.

Analysis of the data led to the following decisions: (1) Certain specialists were eliminated from the base population because their practices were not the types from which it was expected patients would be referred to the clinic. These included radiologists, pathologists, and dermatologists who had referred very few patients to the clinic. This reduced the base population to 1,365 physicians. (2) Type of practice was considered in two dimensions only, that is, general practitioner and specialist. (3) Age was considered in three groups: less than 40, 40-59, and 60 years and over. (4) Because of the small number of Negro physicians (112) they were stratified on the basis of age and number of referrals only. (5) Size of town was stratified in two groups: less than 25,000 and over 25,000 population. (6) Distance from North Carolina Memorial Hospital was stratified in three groups: less than 25 miles, 25-99 miles, and 100 miles or more. (7) The medical school attended by the physician and whether he had attended the University of North Carolina showed no discernible effect on the patterns of referral in 1956. Therefore stratification on these bases was not indicated. The final stratification comprises 117 cells (Table 3).

Selection and Modification of Physician Sample

In selecting a sample of physicians it was decided to take one-twentieth of the nonreferrers, one-third of the physicians referring one or two patients, and one-third of the physicians referring three or more. Sampling was done by cells and

Table 3—Final Stratification of Physicians in Base Population (1956)

No of Referrals	Age	White General Practitioners						White Specialists						Negroes	Totals
		Pop. Under 25,000			Pop. Over 25,000			Pop. Under 25,000			Pop. Over 25,000				
		<25 Mi.	25-99	100+	<25 Mi.	25-99	100+	<25 Mi.	25-99	100+	<25 Mi.	25-99	100+		
0	<40	2	74	55	6	22	1	1	35	27	4	43	14	19	1,068
	40-59	2	66	58	5	16	1	—	80	62	11	113	20	33	
	60+	2	67	51	1	24	3	1	36	20	8	41	9	35	
1 or 2	<40	1	30	12	—	2	—	—	5	5	1	8	1	5	213
	40-59	5	31	13	—	7	1	—	22	13	1	9	1	10	
	60+	—	13	1	—	—	—	1	8	1	1	2	—	3	
3 or more	<40	2	24	4	—	1	—	1	6	2	—	—	—	—	84
	40-59	2	18	1	—	3	—	—	7	—	—	—	—	5	
	60+	1	5	—	—	—	—	—	—	—	—	—	—	2	

Table 4—Sample and Population of Physicians in Study Area—by Strata (Upper figure is number in sample; lower figure is number in population; blank cells are empty.)

No. of Referrals	Age	White General Practitioners						White Specialists						Negroes
		Pop. Under 25,000			Pop. Over 25,000			Pop. Under 25,000			Pop. Over 25,000			
		<25 Mi.	25-99	100+	<25 Mi.	25-99	100+	<25 Mi.	25-99	100+	<25 Mi.	25-99	100+	
0	<40		4* 74	3* 55		1 23		2 36		1* 27		2* 43		1 19
	40-59	1 6	3* 66	3* 58	1 12	1 17			4* 80	3* 62	1 23	6* 113	2* 43	2 33
	60+		3* 67	3 51		1* 27		2 37		1 20		2* 41		2 31
1-2	<40	2 6	10 30	4 12		1 2			2 5	2 5		3 8	1 2	2 5
	40-59		10 31	5 14		3 8			7 22	4 13	1 3	3 9		3 10
	60+		4 13					3 10				1 2		1 3
3+	<40	1 2	8 24	2 5		1 4		3 9						
	40-59	1 3	6 18						2 7					2 5
	60+		2 5											1 2

* Cells for which one physician was added to sample when sample was revised.

necessitated some combining of the cells in their original stratification (Table 4). The combination of cells and the proportion of each cell to be sampled was dictated by the necessity for selecting a sample of workable and realistic size and one which was also representative of the base population.[18] These factors influenced selection of patient and agency samples also. The total sample size came to 156 physicians with 55 who did not refer patients, 72 who referred one or two, and 29 who referred three or more, in 1956.

The names of the physicians in the sample were drawn at random. Non-referring physicians were interviewed when convenient and over the entire field work period. Referring physicians were interviewed after a patient referred by one had visited the clinic and had been admitted to the patient sample.

If a physician could not be located, had died, had moved from the study area, was no longer in practice or refused to participate, he was dropped from the sample and from the base population. The physician's name was replaced unless his exclusion decreased the population of his cell enough to reduce the corresponding sample size.

When 52 physicians in the sample had been interviewed it became apparent that physicians designated as "one or two referrers" were not sending patients to the clinic at a rate sufficient to insure that all in the sample could be interviewed within a reasonable period of time. Apparently many of these physicians do not refer one or two patients every year. In order to compensate for this the total population of physicians who referred one or two patients was added to the sample list. Acceptance

of physicians for the sample was then continued for each cell until the total number for that cell had been attained, whereupon the remaining physicians in that cell were dropped from the sample list.

Preliminary analysis of reasons given for referral in general and referral to a medical center, in the first 52 interviews, using Kendall's coefficient of concordance,[19] indicated that nonreferring physicians gave a wider variety of answers than did physicians in other groups. This led to an increase in the sampling proportion for this group from 5 per cent to 6.5 per cent, the increment being limited by realistic considerations, and resulted in the addition of one physician to each of 13 cells marked by an asterisk in Table 4. These additions, which are not reflected in the figures in the table, increased by one the sample size in each of the designated 13 cells. This brought the total physician sample to 169.

Selection of Patient Sample

The patient sample was keyed to the physician sample. Since the interviewing of a physician was done only after a patient referred by him had been seen in the clinic and interviewed for this study, there was one patient in the sample for each referring physician in the physician sample. For physicians referring three or more patients a second patient was interviewed in order to increase the size of the patient sample and obtain a clearer picture of the habits of these regular referrers. This provided a sample of patients referred by physicians of 130.

Whenever the patient was hospitalized immediately or within an interval of time too short to permit a home visit, the patient was dropped from the study. A period of hospitalization following closely upon the events in the clinic would not permit separate expressions of opinion and feeling concerning these two experiences. This rate of attrition was 19 per cent.

Selection of Other Referral Sources

The other sources of referrals were sampled as follows: (1) The 60 departments of public welfare in the study area were stratified on the basis of distance from North Carolina Memorial Hospital and referral rate; 14 agencies were chosen at random. Included were nine agencies which had referred patients to the General Clinic and five which had not. Eleven patients referred by these nine agencies were included in the patient sample. (2) The 17 vocational rehabilitation counselors in the study area were stratified according to distance from North Carolina Memorial Hospital and referral rate, a random sample of six counselors being drawn. Five patients referred by five of these counselors were selected randomly for the patient sample. One counselor had not referred patients to the General Clinic. (3) Some patients do not have family physicians and refer themselves to the clinic. The 60 counties in the study area were stratified on the basis of distance and rate of referral of the self-referred patients per 100,000 population. A random sample of 12 counties and 13 patients from them was selected.

County health departments are sometimes a source of referral of patients to the clinic. These were eliminated from sampling because the number of patients was only 1.8 per cent of those from the study area. Patients referred from other clinics within North Carolina Memorial Hospital were excluded because these were not considered to be primary referrals.

Ultimately, a sample of 189 physicians and referring agencies and a sample of 159 patients was selected. Interviews with physicians and patients were conducted throughout the calendar year in

order to balance out seasonal variations in the demand for medical care.

Methods of Interviewing Physicians

The physicians in the sample were interviewed by members of the Departments of Medicine and Preventive Medicine in the University of North Carolina School of Medicine. A previous study by Peterson, Andrews, Spain, and Greenberg[20] had demonstrated that physicians could approach physicians on a basis of mutuality of interests and be accorded prompt acceptance. This method involves greater expense than a mail questionnaire, but it was believed the relationship would foster the expression of personal reasons and opinions which would not be apparent from an impersonal questionnaire. In order to minimize changes in referral patterns during the period of field work the physician investigators did not provide gratuitous information about the clinic nor did they voluntarily attempt to correct misconceptions about clinic policies.

Early forms of the protocol for use in interviewing physicians and agencies consisted mainly of a list of structured, directive questions. It was soon realized that this was little better than a mail questionnaire. Through a series of revisions interspersed with pretesting in the field there evolved a focused, nondirective, semistructured interview form.[21,22] Opening questions were designed to focus attention upon the general aspects of the subject following which additional questions led to consideration of specific details. Multiple answers were carefully recorded in the sequence in which they were given; this order may indicate either the relative importance of answers or it may indicate what the respondent believes is expected or acceptable to the interviewer. Experience in pretesting interviews with 20 physicians led the interviewers to anticipate patterns of answers to certain questions. If the interviewee failed to mention the usual and common answers spontaneously, these were suggested by the interviewer and the physician was asked to comment on them. Information gained in this fashion may be difficult to relate to that obtained by nondirection. However, it was believed that use of this additional step was desirable because it would lead to better rapport with the physician, encourage more candid expression of opinion, and result in more complete discussion of the subject.

In final form the interview covered the following areas: (1) reasons for referring a patient to another physician or a medical center; (2) reasons for choice of a particular medical center; (3) reasons for referring the "key patient" (the patient whose referral initiated the interview) to the clinic and whether the referral was initiated by physician, patient, or agency; (4) method of arranging referrals to the clinic and comments concerning this; (5) communication between the physician and the clinic and suggestions for improvement; (6) the physician's judgment of the effect of the referral on the patient's health; (7) the physician's reaction to clinic follow-up visits; (8) the use of community health and welfare agencies in sponsoring the referrals. This protocol was modified slightly to make it suitable for interviewing public welfare case workers and vocational rehabilitation counselors.

Additional information was sought by asking each physician to keep a record of all patients whom he referred out of his practice during a two-week period. This record showed the patient's age, sex, race, where he was referred, and the reason for referral. It was realized that this would provide little information about an individual physician's practice but analysis of the data from groups of physicians should help to describe the population of the patients who were referred.

Methods of Interviewing Patients

A trained medical social worker and a cultural anthropologist with extensive field experience were chosen to interview patients, public welfare case workers, and rehabilitation counselors. The skill and experience of these investigators in conducting penetrating, focused interviews made them much more suitable than unskilled interviewers trained solely for this study.

Identification of these interviewers with the clinic was unavoidable and. although some identification was desirable, this was minimized. The interviewers introduced themselves to patients by stating that they were seeking information which would be helpful in planning clinic services. The interviewers were not given any details of the patient's medical problems in an attempt to maintain objectivity and forestall any tendency to interpret clinical data to the patients. Initially, this research role posed serious conflicts for the social worker when the need for service and the wish to provide it had to be delegated to other persons in favor of the research objectives of the study.[23]

A focused, nondirective, semistructured type of interview was devised similar to the form used for interviewing physicians. This was pretested with approximately 100 patients.

The patient interview was designed to obtain information in the following areas: (1) Whether referral of the patient was suggested by physician, patient or agency; (2) reasons for going beyond the local environs and for choosing the General Clinic of NCMH; (3) the total cost of the clinic visit to the patient including fees, transportation, meals, lodging, care of children, and wages lost; (4) the patient's expectations and satisfactions regarding clinic procedures; (5) the patient's concept of the role of the clinic in providing medical care; (6) the effect of the clinic visit on the resolution of the patient's health problems and the patient's understanding of the clinic's recommendations.

Initiation of Patient Interview

The events leading to the interviews with patient and physician were initiated by the appearance in the clinic of a patient referred by a physician or agency in the sample. A request for an appointment usually preceded by several days the patient's arrival in the clinic, which made it possible to anticipate and arrange for the interview.

Because of the limitations on time during the first clinic visit, only a very brief interview was feasible. At the outset the brevity of this interview was thought to be a handicap, but it was soon apparent that in the familiar surroundings of his home the patient was more at ease and better able to focus on the clinic visit.

In the ten or fifteen minutes available to the interviewer during the patient's initial clinic visit, emphasis was placed on establishing rapport with the patient, enlisting his cooperation and explaining the reasons for the interview. It was essential to obtain precise directions for locating the patient's home, a complicated task in rural areas. Consultation with the patient's clinic physician enabled the social worker to ascertain when the patient's evaluation had been completed and when the final home interview would be appropriate. The time elapsing between initial clinic visit and home interview varied from four to eight weeks. It was usually possible for the interviewer to establish rapport and overcome cultural barriers during the brief interview in the clinic so that her visit to the home was welcomed. A few patients (4.5 per cent) refused to permit the home interview although all cooperated at the time of the clinic visit. Because of employment demands upon the patient, the home interview occasion-

ally was conducted in the less favorable environment of the patient's place of employment, a condition which tried the ingenuity of the interviewers.

Initiation of Physician Interview

As soon as evaluation of the patient was completed and the customary summary letter sent to the referring physician or agency, the director of the study was notified. A letter from the dean of the School of Medicine was then sent to the referring physician stating the aims of the study and introducing one of the physician interviewers. Several days later a convenient time and place for the interview was arranged by telephone. Physicians were interviewed in their offices, in their homes, in hospital conference rooms or at lunch. Similar arrangements were made by the social worker and anthropologist for interviewing public welfare case workers and rehabilitation counselors.

Despite the fact that this interview represented another demand on the time of the busy practicing physician, the opportunity to discuss the subject at hand usually was met with enthusiasm. The refusal rate was less than 1 per cent.

Comments

An individual's decision to seek a physician's help and the physician's decision that he requires consultant advice are among the most important, yet least studied, processes in the field of medical care. Koos[24] has studied the first of these problems and the present investigation extends his studies in attempting to define determinants of referral from the family physician to a university clinic.

Preliminary analysis of the data indicates that the frequency of referral, to a university clinic at least, is not constant among physicians in the low frequency group. This variation of referral pattern necessitated a change in sampling method in order to fill the sample of physicians in the "one or two referrer" group in a reasonable period of time. It is possible that this finding is related to the tentative conclusion that patients exert substantially more influence in initiating referrals than was anticipated.

Another complication was the fact that 19 per cent of the patients seen in the clinic were hospitalized within a week or two of their initial clinic visits. This resulted in preliminary interviewing of an unforeseeably large number of patients who were subsequently dropped from the sample.

The low refusal rate among physicians for interviews documents the willingness of physicians to collaborate readily and frankly in studies of medical care.

The design of this study may have application in the investigation of the patterns of hospital admissions, the management of specific diseases, and the evaluation of other medical care programs. It may be particularly pertinent to planning the development of health centers in rural areas.

Summary

1. Methods for analysis of the physician population of a rural state and the population of patients referred to a university hospital outpatient department in the course of one year are described.

2. A method for proportional sampling and stratification of the physician and patient populations in a study of the process of patient referral is discussed.

3. Application of the focused, semistructured, nondirective interview is discussed.

4. Certain problems and complications in the design of the study are reviewed.

5. Possible applications of the design to other medical care problems are mentioned.

ACKNOWLEDGMENTS — Grateful acknowledgment is made for the helpful criticism supplied by Harvey L. Smith, Ph.D., Social Research Section, Division of Health Affairs, and Kurt Back, Ph.D., Department of Biostatistics, Uni-

versity of North Carolina; Paul Densen, Ph.D., Hospital Insurance Plan of Greater New York; Joseph L. Stokes, III, M.D., Department of Preventive Medicine, Harvard Medical School; and for the support of the presidents of the North Carolina State Medical Society, the North Carolina Academy of General Practice, the North Carolina Society of Internal Medicine, and the Old North State Medical Society; the commissioner of the North Carolina State Board of Welfare; and the director of the North Carolina State Division of Vocational Rehabilitation.

APPENDIX

Sources of Supplementary Data

1. American Medical Directory. American Medical Association, Chicago, Ill., 1956.
2. Physicians of North Carolina. Unpublished Lists, Hospital Savings Association of North Carolina, Chapel Hill, N. C., 1956.
3. Roster of Fellows. The Medical Society of the State of North Carolina, Raleigh, N. C., 1956.
4. Alumni Directory. Alumni Office of University of North Carolina, Chapel Hill, N. C., 1954.
5. The World Almanac. New York World-Telegram and Sun, New York, N. Y., 1956.
6. North Carolina Road Map. General Drafting Company, Convent Station, N. J., 1956.

REFERENCES

1. American Hospital Association. Hospital Statistics, Guide Issue. Hospitals 32: Part 2, 420 (Aug. 1), 1958.
2. Davis, M. M. The Function of a Dispensary or Out-Patient Department. Boston Med. & Surg. J. 171: 335 (Aug. 17), 1914.
3. Ferguson, T., and Macphail, A. N. Hospital and Community, New York, N. Y.: Oxford University Press, 1954.
4. Lee, S. S. A Fresh Look at Outpatient Department Problems. Hospitals 32:35 (Mar. 1), 1958.
5. Cabot, R. C. Suggestions for the Reorganization of Hospital Out-Patient Departments, with Special Reference to the Improvement of Treatment. Maryland M. J. 1:81 (Mar.), 1907.
6. ————. Out-Patient Work: The Most Important and Most Neglected Part of Medical Service. J.A.M.A. 59:1688 (Nov. 9), 1912.
7. ————. What Dispensary Work Should Stand For. Mod. Hosp. 7:467 (Dec.), 1916.
8. Emslie, A. G. The Appropriate Role of the Out-Patient Department in the Hospital Service. Roy. Soc. Health J. 78:453 (July-Aug.), 1958.
9. Fry, J. The Out-Patient Department and the General Practitioner. Ibid. 78:460 (July-Aug.), 1958.
10. Editorial. The Out-Patient Department. Lancet 1: 1007 (May 0), 1958.
11. Odoroff, M. E., and Abbe, L. M. Factors in Outpatient Visits. Pub. Health Rep. 72:487 (June), 1957.
12. Moffatt, H. N. A Survey of Attitude Toward Clinic Care of 109 Clinic Patients at the Long Island College Hospital. Unpublished thesis, New York School of Social Work, New York, Columbia University, 1946.
13. Reader, G. G.; Pratt, L.; and Mudd, M. C. What Patients Expect From Their Doctor. Mod. Hosp. 89:88 (July), 1957.
14. Pratt, L.; Seligmann, A.; and Reader, G. G. Physicians' Views on the Level of Medical Information Among Patients. A.J.P.H. 47:1277 (Oct.), 1957.
15. Solon, J.; Sheps, C. G.; Lee, S. S.; and Jurkowitz, M. Staff Perception of Patient's Use of a Hospital Outpatient Department. J. M. Educ. 33:10 (Jan.), 1958.
16. Daley, D. J.; Block, L.; and Lamson, G. C. Research Grants Program of the Public Health Service. Hospitals 31:44 (May 1), 1957.
17. White, K. L., and Fleming, W. L. Improving Teaching on Ambulant Patients. J. M. Educ. 32:30 (Jan), 1957.
18. Cochran, W. G. Sampling Techniques. New York, N. Y.: Wiley, 1953.
19. Kendall, M. G. The Advanced Theory of Statistics, Vol. 1, London, England: Charles Griffin, 1948, pp. 410–421.
20. Petersen, O. L.; Andrews, L. P.; Spain, R. S.; and Greenberg, B. G. An Analytical Study of North Carolina General Practice. J. M. Educ. 31: Part II (Dec.), 1956.
21. Merton, R. K.; Fiske, M.; and Kendall, P. The Focused Interview. Glencoe, Ill.: Free Press, 1956.
22. Riesman, D., and Benney, M., ed. The Interview in Social Research. Am. J. Sociol. 62:137–217 (Sept.), 1956.
23. Maas, H. Collaboration Between Social Work and the Social Sciences. Social Work J. 31:104 (July 1), 1950.
24. Koos, E. L. The Health of Regionville: What the People Thought and Did About It. New York, N. Y.: Columbia University Press, 1954.

The authors are associated with the Departments of Preventive Medicine and Medicine, School of Medicine, and the Department of Biostatistics, School of Public Health, University of North Carolina, Chapel Hill, N. C.

This study was supported by a Research Grant (W-74) from the Division of Hospital and Medical Facilities, Public Health Service.

This paper was presented before the Statistics Section of the American Public Health Association at the Eighty-Sixth Annual Meeting in St. Louis, Mo., October 29, 1958.