

APPROVED

DETERMINATION OF WAITING ROOM SPACE: U.S.
ARMY HOSPITAL, FORT CAMPBELL, KENTUCKY

Director of the Program

A Problem Solving Thesis

APPROVED BY THE

Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Hospital Administration

By

APPROVED BY THE GRADUATE COUNCIL:

Captain Nancy R. Ashley, ANC

Dean of the Graduate School

Waco, Texas

DATE:

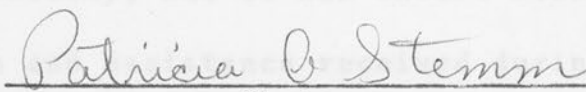
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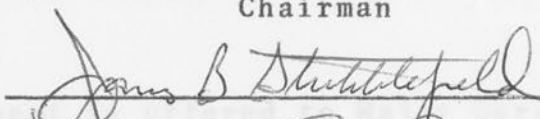
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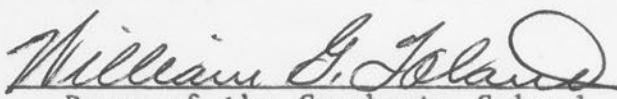

Director of the Program

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APPROVED BY THE GRADUATE COUNCIL:


Dean of the Graduate School

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ABSTRACT

DETERMINATION OF WAITING ROOM SPACE: U.S. ARMY HOSPITAL, FORT CAMPBELL, KENTUCKY

A Problem-Solving Thesis Submitted to the Faculty of Baylor University
in Partial Fulfillment of the Requirements for the Degree of
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60 Pages

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The problem was to develop a model for determining the number of clinic waiting spaces needed in the proposed new hospital facility for U.S. Army Hospital, Fort Campbell, Kentucky.

A one-week survey was made of the number of people waiting in thirteen clinic waiting areas at the U.S. Army Hospital, Fort Campbell. The data were then correlated with data concerning the number of patients seen. The purpose of the correlation was to determine the feasibility of using the projected clinic work load as a predictor of the number of waiting spaces needed.

The conclusion of the study was that the number of patients seen in a clinic is a valid and reliable predictor of the number of waiting spaces needed.

The recommendations of the study were: (1) the number of waiting spaces allocated by the OTSG "Utilization and Requirement Study" for the new facility for the U.S. Army Hospital, Fort Campbell, Kentucky, be re-evaluated utilizing the model developed by the study; and (2) the method for determining waiting space requirements as described in the study be utilized by facility planners when designing waiting rooms for outpatient clinics.

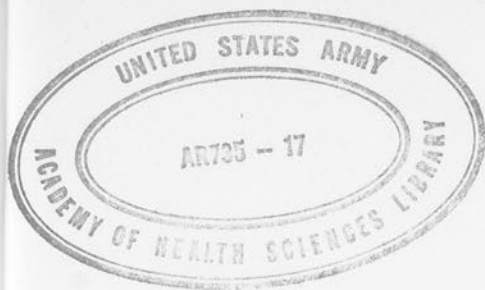


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III. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Recommendations

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CHAPTER 1

INTRODUCTION

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CHAPTER I

INTRODUCTION

Today our nation's health care system is undergoing many revolutionary innovations, one of the most dramatic of which is the recognition of the outpatient facility as a major component of the total health care delivery system. Historically, hospitals were planned and organized around the care of the inpatient; it was on the basis of bed count that space requirements were projected and that money for construction was allocated. A few hospitals did have outpatient departments (Definitions, Appendix A), but these were designed to care for the indigent population and were often relegated to the basement. Outpatient departments were essentially considered to be a reservoir from which to keep beds filled and teaching material available.¹

Since World War II, however, there has been an increasing demand for outpatient services. In 1947, for example, there were 41 million outpatient visits to hospitals; in 1962 there were 99 million; and in 1971 there were 200 million visits.² This increased demand--along with the newly emerging belief that "health care is a right" and the concern

for the rapidly escalating cost of health care--has produced a reversal in the attitude of the health care industry toward the outpatient department. Ambulatory care is now considered to be a major solution to the problem of providing health care for all at a reasonable cost. The health care facility of the future will be viewed as an ambulatory care (Appendix A) center with inpatient beds attached.

Facilities for ambulatory care are grossly inadequate. The outpatient department and particularly its waiting rooms have been neglected for far too long when new facilities are considered. Jones and Smock believe that:

The typical outpatient department is a crowded facility with long lines of patients, many of them geriatric patients, standing or sitting in corridors or small, noisy waiting rooms where the light level, noise level, general atmosphere, and necessary comfort features range from poor to bad.³

As outpatients generally spend the greater portion of their time in waiting rooms, and as increasing emphasis is being placed on the importance of a therapeutic environment, it would seem that waiting rooms should be given choice space (such as that with windows) in the ambulatory care facility.

This study is concerned with the determination of waiting room space requirements for the proposed new hospital facility for Fort Campbell, Kentucky.

The Problem

The problem is to develop a model for determining the number of clinic waiting spaces needed in the proposed new hospital facility for U.S. Army Hospital, Fort Campbell, Kentucky.

Hospital History and Setting

The U.S. Army Hospital, Fort Campbell, Kentucky, was opened on August 19, 1942, during the World War II mobilization and is one of the two-story, semipermanent, cantonment-type facilities constructed at that time. It consists of fifty-three buildings connected by over seven miles of corridors and extends over seventy-two acres of land. The hospital is currently classified as a 350-bed, short-term, general hospital serving a total population of approximately 60,000 people.

Conditions Prompting the Study

The Army Military Construction Agency has programmed a new \$40 million facility for the U.S. Army Hospital, Fort Campbell, Kentucky. It is projected that the construction of this facility will begin in FY 1976. The initial "Utilization and Requirement Study" has been completed by the

Office of the Surgeon General (OTSG) and approved at the Department of Defense (DOD) level. It has not yet been reviewed by the Office of Management and Budget (OMB) or approved by Congress.

As a part of the planning effort, the Management Services Office, U.S. Army Hospital, Fort Campbell, Kentucky, has asked for an analysis of the space requirements for waiting room for the outpatient portion of the new facility. It seems that one of the common complaints about new military outpatient facilities has been the inadequacy of waiting space. There is some doubt as to the present adequacy of the Department of Defense guidelines (Appendix B) for determining waiting room space.⁴ The current guidelines were published in 1965 and have not been updated.

Furthermore, there is an immediate and very decided emphasis being placed on the delivery of ambulatory services within the military (Appendix C). By way of emphasis, portions of the Office of the Surgeon General letter titled "Improvement of Outpatient Health Care" is quoted here:

Commanders will insure the delivery of high quality care to the ambulatory patient in a manner which is acceptable to patients and the hospital staff. This would appear to necessitate several actions, not the least of which is a reorientation in thinking as well as resources. . . .

.

Within existing resources a high priority is placed on equipment and material requirements in outpatient clinics and supportive areas. . . .⁵

Limitations

This study is concerned only with clinic waiting spaces (Appendix A) for the new hospital facility projected for the U.S. Army Hospital, Fort Campbell, Kentucky. It does not include waiting spaces for ancillary (Appendix A) or inpatient services.

The physical examination section, dental clinic, and outlying troop clinics were not included in the sampling process due to their relative inaccessibility; therefore, they are not included in the study.

A limitation of three observations per day was imposed by (1) the spread of the clinics throughout the cantonment facility, and (2) the necessity for eliminating the bias that could possibly result from the utilization of hospital personnel in the survey process.

Criteria

Any model for determining waiting room spaces should:

1. Provide a management tool, sufficiently basic and uncomplicated, to permit manipulation by the average project

officer. Mount Zion Hospital and Medical Center of San

Francisco. 2. Predict the number of waiting spaces needed with a degree of reliability consistent with acceptable statistical standards.

Assumptions

It is assumed that:

1. The demographic mix of the population served by the U.S. Army Hospital, Fort Campbell, Kentucky, will remain the same.
2. There will be no change in the appointment system currently in use at Fort Campbell.
3. The current composition of the clinic waiting areas at Fort Campbell will be retained.

Review of the Literature

Perusal of the literature reveals a dearth of information concerning the design of waiting rooms. Comments like the following made by Gordon A. Friesen, stating that "waiting areas, toilet facilities, and the like must be designed with the comfort and convenience of the patient in mind"⁶ (without further elaboration), are fairly typical of the amount of attention given to the problem. At the opposite

extreme, Mount Zion Hospital and Medical Center of San Francisco gives waiting rooms prime space in their outpatient facility. They reason that because outpatients spend a greater portion of their time in waiting rooms, a pleasant atmosphere would serve to reduce the tedium of waiting and ameliorate its deleterious effects.⁷

The literature does reflect a trend toward more consideration for the patient's esthetic and psychosocial needs in hospital design. European hospitals seem to be in the forefront in this respect, for they often allot two times the space for the various areas as is allotted in the United States and decorate by means of paintings, sculpture, wood paneling, and stained glass.⁸

There is also a growing concern for more flexibility and expansion capability of both clinic and waiting areas (Appendix A) in outpatient facilities. The immediate past history of health care is replete with innovations and changes, and it is felt that today's plans will not provide precisely for tomorrow's needs.⁹ Therefore, the more innovative hospital designers such as Gordon A. Friesen are designing clinics and waiting areas that will accommodate various services as the need arises; and that are located so they can accept

waiting areas could be shared in most areas except obstetrics-spillovers from other areas.¹⁰

In the area of waiting space requirements, the American Institute of Architects recommends, as a preliminary assumption for waiting room space, one and one-half square feet per person served. Using this formula, a clinic with an average daily work load of 100 patients would have 150 square feet of waiting room space. The American Institute of Architects also recommends a minimum room dimension of 7 feet. According to this criterion, the smallest waiting room must be at least 7 x 7 x 7 feet.¹¹ E. Todd Wheeler states that experience has shown that the number waiting may be as much as the full clinic load for that afternoon and that it is wise to estimate a waiting load of at least 85 per cent of the clinic capacity for each morning or afternoon. He feels that it is best to decentralize waiting as much as possible without losing control or duplicating space, realizing, of course, that decentralization--although convenient for all concerned--reduces flexibility slightly and does call for a little more space.¹²

The Subcommittee for Design of Ambulatory Facilities at the Seminar for Ambulatory Health Care Services held in San Antonio, Texas, in November, 1971, suggested that patient

waiting areas could be shared in most areas except obstetrics-gynecology and pediatrics.¹³

The first principle of a hospital is to do the sick no harm. However, the typical waiting room is makeshift, dark, dismal, congested, and generally depressing, producing unnecessary anguish for the patient who is probably already worried about his health.¹⁴ Waiting rooms of the future must be designed with an understanding of their psychological and social impact on the patient. Basic to the design of waiting rooms is the determination of the number of waiting spaces needed.

Methodology

An extensive review of the literature was made in an attempt to identify current methods for determining the number of waiting spaces needed for outpatient clinics.

Data were collected from the clinic records at the U.S. Army Hospital, Fort Campbell to determine the number of patients seen daily by each clinic. Unstructured interviews were held with the Management Services Officer and other administrative personnel at the hospital who are involved in the planning of the proposed new facility.¹⁵

A one-week survey was made of thirteen waiting areas

at the U.S. Army Hospital, Fort Campbell in an attempt to determine the number of people waiting. A "random numbers table" was used to determine observation times. A total of fifteen observations were made for each clinic--three per day during clinic hours. Approximately one hour, distributed around the scheduled observation time, was required to complete each set of observations. Each observation consisted of a count of the number of people, both patients and companions, waiting. Those being served in any way, whether by clerks or nursing personnel, were not included in the count. These data were then correlated with the data concerning the number of patients seen. The purpose of the correlation was to determine the feasibility of using the projected clinic work load as a predictor of the number of waiting spaces needed.

Interviews were also held with the Chief, Facilities Branch, Logistics and Facilities Division, Office of the Surgeon General and the Deputy Director for Health Facilities and Special Projects, Office of the Assistant Secretary of Defense, Health and Environment. These interviews were held in an attempt to determine (1) current trends in allocation of waiting room space for military facilities, (2) the

adequacy of the DOD guidelines for determining waiting space, and (3) the proper manipulation of the DOD guidelines.¹⁶

Footnotes

¹Roslyn Lindheim, "Ambulance or Ambulant?," Hospitals, XLI (February, 1967), 46-47.

²American Hospital Association, Hospital Statistics 1971 (Chicago: American Hospital Association, 1972), p. 12.

³Walk C. Jones, III and E. William Smock, "Built-in Traffic Control: Foundation of Good Design," Hospitals, XLI (February, 1967), 51.

⁴Interview with LTC Robert O. Haas, Chief, Facilities Branch, Logistics Branch, Logistics and Facilities Division, Office of the Surgeon General, April, 1973.

⁵OTSG Letter (Appendix B).

⁶Gordon A. Friesen, "Ambulatory Care Space Must be Able to Grow with the Service," Modern Hospital, CXVIII (June, 1972), 83.

⁷"Outpatient Building Housing Tumor Clinic Gives Waiting Rooms Prime Space," Hospitals, XLI (February, 1967), 88.

⁸D. William Gerberich, "Key Factors to Consider in Deciding on Location, Space for Departments," Hospital Topics, L (March, 1972), 26.

⁹Friesen, p. 80.

¹⁰"Outpatient Building," p. 89.

¹¹Charles G. Ramsey and Harold R. Sleeper, Architectural Graphic Standards, ed. by Joseph N. Boaz (6th ed.; New York: John Wiley and Sons, Inc., 1970), p. 13.

¹²E. Todd Wheeler, Hospital Design and Function (New York: McGraw-Hill Book Co., Inc., 1964), pp. 224-25.

¹³Proceedings of the Seminar on Ambulatory Health Services, Brooke Army Medical Center, Fort Sam Houston, Texas, November 8-12, 1971, sponsored by The Surgeon General, Department of the Army.

¹⁴"Prizewinning Clinic Stresses Comfort for Patients, Efficiency for Staff," Hospitals, XLI (February, 1967), 100.

¹⁵Unstructured interviews with Major Walter C. Rose, Management Services Officer, and other administrative personnel at U.S. Army Hospital, Fort Campbell, Kentucky, March, 1973.

¹⁶Hass interview; Private interview with LTC Gordon K. Dowery, Deputy Director for Health Facilities and Special Projects, Office of the Assistant Secretary of Defense, Health, and Environment, San Antonio, Texas, May, 1973.

CHAPTER II

DISCUSSION

In planning the new facility for U.S. Army Hospital, Fort Campbell, Kentucky, it is necessary that one be able to predict the number of waiting spaces needed for the various clinics. Logically, there would seem to be a correlation between the number of patients seen in a clinic and the number of people waiting to be seen. The question is whether there is sufficient correlation to recommend the use of the number of patients seen as a predictor of the number of waiting spaces needed.

Linear Regression and Correlation¹

Whenever possible, scientists strive to express relationships between quantities that are known and quantities they want to predict in terms of mathematical equations. Of the many equations that can be used for the purpose of prediction, the simplest and most widely used is the linear (regression) equation, which is the form

$$y = a + bx$$

and which describe "y" as a linear function of "x." "A"

and "b" are numerical constants and are usually estimated on the basis of sample data. Once the constants are known, one can calculate a predicted value of "y" for any given value of "x" simply by substitution. The term "linear equation" arises from the fact that when plotted on a graph, all pairs of values of "x" and "y" which satisfy an equation of the form $y = a + bx$ fall on a straight line.

In a problem of prediction where one wishes to use a regression equation, there are essentially three steps to follow: One must first determine whether the relationship is linear. This question can be decided by plotting a scatter diagram. If the overall pattern of the relationship is best described by a straight line rather than some type of curve, use of a linear equation is justified.

The second step is that of obtaining the equation of the straight line which best fits the sample data by the methods of least squares. The line which best fits the data is that line where the sum of the squares of the vertical deviations (distances) from the points to the line is minimized. This step yields the numerical values for the constants "a" and "b," and the equation obtained is the desired predictor equation.

Finally, having obtained the predictor equation, one must determine whether or not the predictions obtained by use of the equation are reliable to a degree consistent with acceptable statistical standards. The simple correlation coefficient (r) describes the degree of linear relationship between the two variables x and y on a scale of 0 (no linear relationship) to 1 (a perfect linear relationship). Whether or not the " r " is significant depends on the size of the sample. The smaller the sample the larger the " r " must be to be significant. The " r^2 " is the per cent of the total variability of the observed " y 's" which can be explained by or attributed to the linear relationship rather than to chance.

In problems of prediction one must be careful when going beyond the range of the observed data. One can still predict average point values but not deviations.²

Prediction of Mean Number of People Waiting

The results of a random sample survey of the number of people waiting in thirteen clinic areas at Fort Campbell are shown in Table 1. The utilization of a random number table for determination of observation times ensured that each hour of the clinic workday had an equal chance of being

TABLE 1

SAMPLE OBSERVATIONS, NUMBER OF PEOPLE WAITING

Clinic Waiting Areas	Wednesday			Thursday			Friday			Monday			Tuesday		
	0900	1100	1300	0900	1300	1400	1100	1400	1600	0800	1500	1600	0800	1200	1500
Allergy, Pulmonary															
Function*	--	0	0	1	0	0	0	0	0	0	1	0	0	0	0
Dispensary #1 (Troop)	3	0	1	2	0	0	1	0	0	0	0	0	2	0	0
Urology	4	0	1	13	7	1	2	0	0	0	1	0	0	0	0
Emergency Room	0	4	0	1	5	0	1	0	1	0	0	1	4	7	4
Dermatology,															
Neurology	1	0	0	10	0	0	16	0	1	1	2	2	7	3	0
General Medicine	2	8	2	2	0	10	0	2	0	2	6	2	2	4	0
Eye, Ear, Nose,															
Throat (EENT)	7	5	9	6	0	8	4	12	9	6	18	2	2	5	0
General Surgery	0	4	0	3	0	27	6	9	24	0	19	1	0	0	0
Neuropsychiatry*	--	0	9	5	3	3	5	5	0	5	4	1	4	2	2
Adult Outpatient	8	3	6	3	5	9	24	15	8	8	20	1	18	6	0
Orthopedics,															
Podiatry	4	6	17	13	18	9	10	29	10	2	44	0	3	11	0
Obstetrics, Gynecology															
(OB, GYN)	5	1	0	70	1	3	39	35	33	5	3	0	16	21	0
Pediatrics	27	0	15	20	17	25	44	23	25	12	10	0	1	16	9

*Were not included in orientation tour, thus were not discovered in time to include them in first set of observations.

observed. This precluded the natural tendency to look at the waiting areas only at the busiest hours of the day.

The period of time included in the survey was from February 28 through March 6, 1973--one week. Thus, there was some reflection of daily fluctuations in the sampling process. The number of patient visits per day per clinic during the same time period was determined from clinic records and are shown in Table 2.

TABLE 2

NUMBER OF PATIENTS SEEN

Clinics	Wednesday	Thursday	Friday	Monday	Tuesday
Allergy, Pulmonary Function	5	5	0	4	4
Dispensary #1	6	12	12	11	10
Urology	24	28	22	22	4
Emergency Room ^a	24	21	17	35	33
Dermatology, Neurology	25	31	43	38	31
General Medicine	44	34	9	48	40
EENT	37	50	23	54	44
General Surgery	33	46	49	54	38
Neuropsychiatry	68	51	47	65	58
Adult Outpatient	118	76	67	96	90
Orthopedics, Podiatry	102	76	94	116	96
OB-GYN ^b	66	134	196	98	200
Pediatrics	150	143	159	109	157

^aNumber of emergency room visits during regular clinic hours only.

^bThe OB-GYN clinic includes patient-physician telephone calls in the total number of patient visits. As no other clinic does this, these calls have been subtracted from the total number of patient visits for the purpose of this study.

Source: From clinic records--February 28 through March 6, 1973.

The daily average (arithmetic mean) for the total clinic visits for March, 1973, was 1,684 visits as determined from the "Outpatient Report" DA Form 3537. Thus, the average daily work load for all clinics of 1,300 to 1,400 visits that has been projected for the new facility falls well within the range of the observed data.³ Deviations as well as average point values can be predicted.

Table 3 compares the mean number of patients waiting with the mean number of patients seen per clinic during the one-week survey. A scatter diagram of the data is shown in

TABLE 3
COMPARISON OF MEANS: PEOPLE WAITING
WITH PATIENTS SEEN

Clinics	Mean Number People Waiting	Mean Number Patients Seen
Allergy, Pulmonary Function	0.14	3.6
Dispensary #1	0.60	10.2
Urology	1.93	20.0
Emergency Room	1.87	26.0
Dermatology, Neurology	2.87	33.6
General Medicine	2.80	35.0
EENT	6.20	41.6
General Surgery	6.20	44.0
Neuropsychiatry	3.43	57.8
Adult Outpatient	8.93	89.4
Orthopedics, Podiatry	11.73	96.8
OB-GYN	14.86	138.8
Pediatrics	16.26	146.6

Figure 1. Visual examination of the overall pattern of the scatter diagram reveals what seems to be a linear relationship between the mean number of people waiting and the mean number of patients seen for each clinic. Thus, the use of a linear predictor equation is justified.

Simple correlation and regression analysis of the data using the computer (Appendix D) yields the predictor equation.

$$(1) y^1 = -0.48 + 0.11x$$

where the dependent variable "y" equals the number of people waiting and the independent variable "x" equals the number of patients seen per day. The prime on the "y" is used to distinguish between the observed values of "y" and the calculated values obtained with the equation of the line. The value of "a" (the intersect of the line, with the "y" axis) is -0.48, and the value of "b" (the slope of the equation) is 2.11. Thus, the predicted value of "y" for any given value of "x" is obtained by multiplying "x" by 0.11 and adding -0.48. For example, should $x = 100$, $y^1 = -0.48 + 0.11(100) = 10.52$. The prediction is that for a daily work load of 100 patients, the number of waiting spaces needed will, on the average, be 10.52. Figure 2 shows the straight line

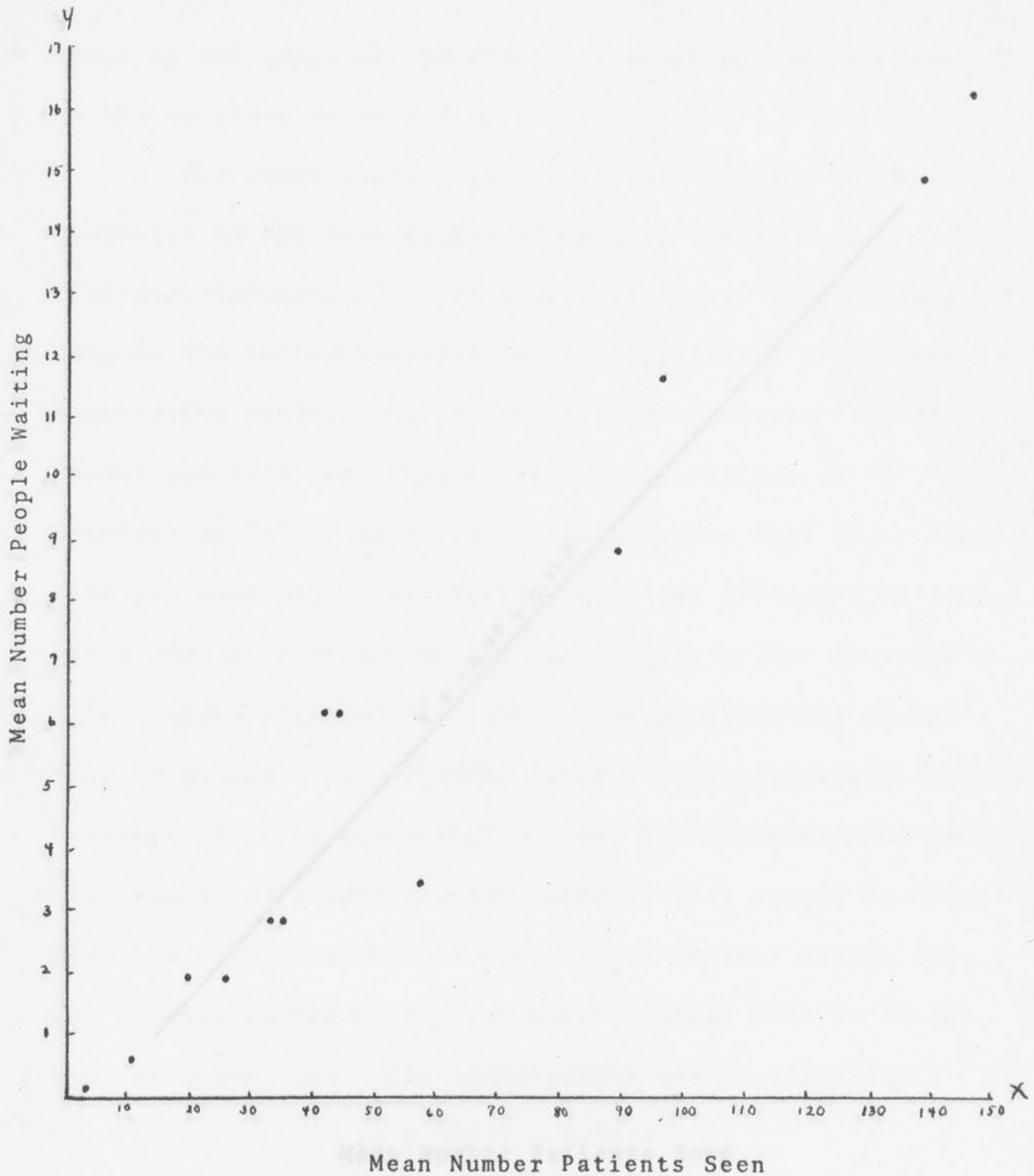


Fig. 1.--Scatter diagram showing the relationship of the mean number of people waiting to the mean number of patients seen for each clinic.

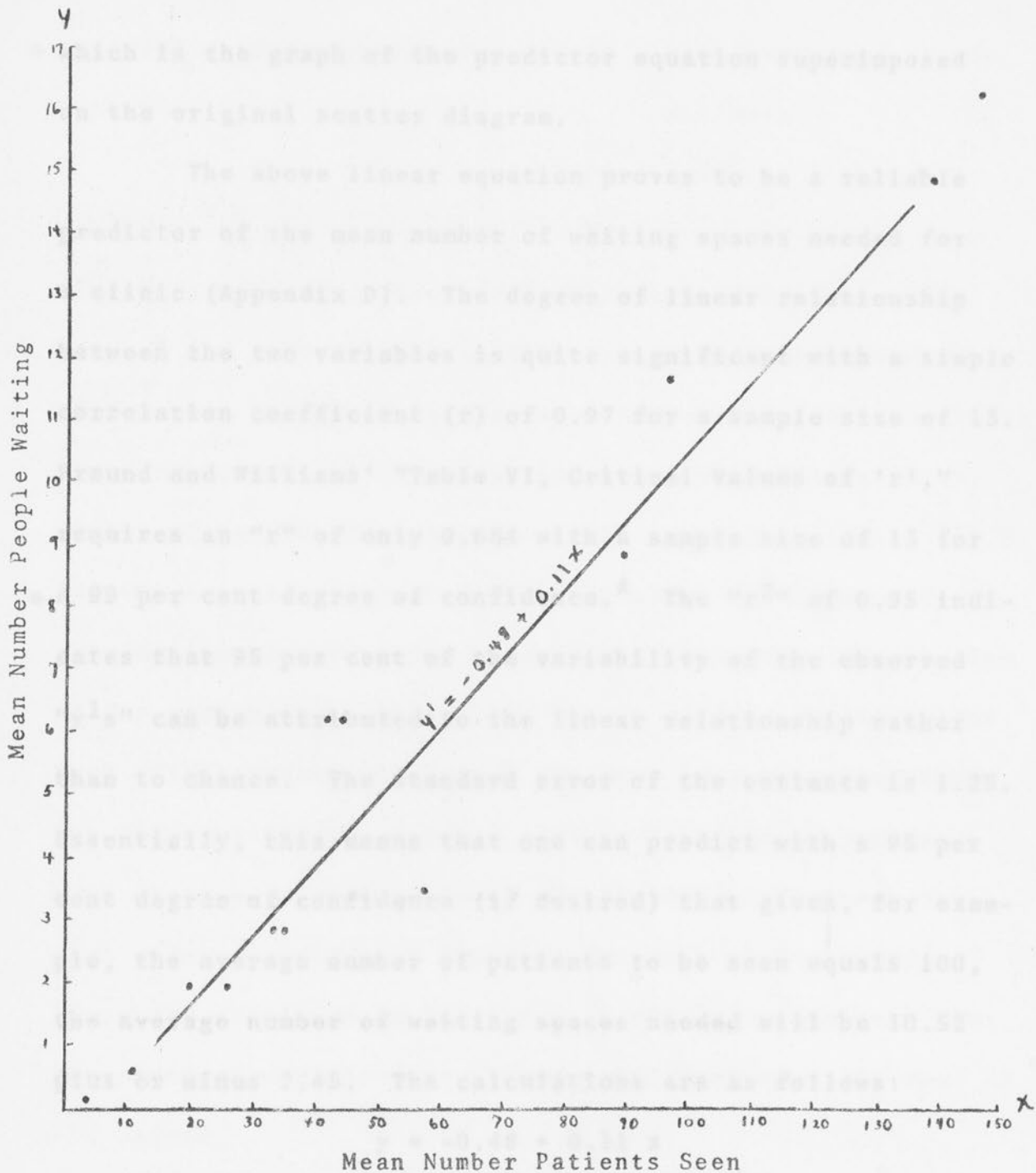


Fig. 2.--Graph of the predictor equation, $y' = -0.48 + 0.11x$, superimposed on original scatter diagram.

which is the graph of the predictor equation superimposed on the original scatter diagram.

The above linear equation proves to be a reliable predictor of the mean number of waiting spaces needed for a clinic (Appendix D). The degree of linear relationship between the two variables is quite significant with a simple correlation coefficient (r) of 0.97 for a sample size of 13. Freund and Williams' "Table VI, Critical Values of ' r '," requires an " r " of only 0.684 with a sample size of 13 for a 99 per cent degree of confidence.⁴ The " r^2 " of 0.95 indicates that 95 per cent of the variability of the observed " y 's" can be attributed to the linear relationship rather than to chance. The standard error of the estimate is 1.25. Essentially, this means that one can predict with a 95 per cent degree of confidence (if desired) that given, for example, the average number of patients to be seen equals 100, the average number of waiting spaces needed will be 10.52 plus or minus 2.45. The calculations are as follows:

$$y = -0.48 + 0.11 x$$

$$x = 100$$

$$y = -0.48 + 0.11 (100)$$

$$y = -0.48 + 11$$

$$y = 10.52$$

95% confidence interval = 1.96 x standard error of the estimate

$$= 1.96 \times 1.25$$

$$= 2.45$$

(The degree of confidence desired is a command decision.)

The above linear equation is an excellent predictor of the mean number of waiting spaces needed for a clinic. However, because of the large amount of variability in the number of people waiting in a clinic at various times (Table 1), the mean is not a good representation of the number of waiting spaces needed for a particular clinic. (Examination of the median and mode for the number of people waiting for each clinic reveals that they are even less representative for this particular sample.) The variability is perhaps best shown by a comparison of the standard deviations for each clinic sample with the mean for each clinic sample. These are displayed in Table 4. It can be easily seen that the standard deviation is frequently larger than the mean of the sample.

Prediction of Standard Deviation

Simple correlation and regression analysis (Appendix D) of the standard deviations as a function of the means

TABLE 4

COMPARISON OF STANDARD DEVIATIONS TO
MEANS OF PEOPLE WAITING

Clinics	Mean Number People Waiting	Standard Deviation	Standard Deviation as a Per Cent of Mean
Allergy, Pulmonary Function	0.14	0.36	257
Dispensary #1	0.60	0.99	165
Urology	1.93	3.63	185
Emergency Room	1.87	2.29	122
Dermatology, Neurology	2.87	4.64	161
General Medicine	2.80	3.00	107
EENT	6.20	4.72	76
General Surgery	6.20	9.38	151
Neuropsychiatry	3.43	2.41	70
Adult Outpatient	8.93	7.16	80
Orthopedics, Podiatry	11.73	11.83	101
OB-GYN	14.86	19.94	134
Pediatrics	16.26	11.86	71

yields the standard deviation predictor equation

$$(2) y^1 = 0.66 + 0.95 x$$

where "y" is the standard deviation and "x" is the mean of the number of people waiting for a specific clinic. The degree of linear relationship is significant for this comparison, also, although it is somewhat less than that found in the previous situation. The simple correlation coefficient (r) equals 0.91 with an "r²" of 0.82 and a standard error of the estimate of 2.43.

Prediction of Waiting Spaces Needed

Prediction of waiting spaces needed with a 95 per cent degree of confidence using the above predictor equations involves the following four steps:

1. Estimation of the average daily work load per clinic.
2. Determination of the mean number of people that can be expected to be waiting in each clinic waiting area (y) by substituting the average daily work load (x) into the first predictor equation, $y^1 = -0.48 + 0.11x$, and solving the equation.
3. Determination of the standard deviation (y) by substitution of the mean obtained above (x) into the second predictor equation, $y^1 = 0.66 + 0.95x$, and solving this equation.
4. Addition of the mean and 1.96 times the standard deviation (95 per cent confidence interval) to determine the upper boundary for the number of waiting spaces needed. (The upper boundary is the relevant boundary because the desire is to provide the maximum number of needed waiting spaces consistent with available resources.)

As stated previously, an average daily work load for

all clinics of 1,300 to 1,400 visits has been projected for the new facility for the U.S. Army Hospital, Fort Campbell, Kentucky. The Department of Defense guidelines for determining waiting room space uses only the high nine of the proceeding twelve months to obtain average work loads. Application of this procedure to the high nine of the proceeding twelve months of clinic work loads at the U.S. Army Hospital, Fort Campbell, yields an average daily clinic work load for all clinics of 1,379 which falls well within the range of the above projection. It seems logical, therefore, to use an average of the high nine of the proceeding twelve months' work load for each clinic in developing estimates of average daily work loads for the individual clinics. The estimates obtained by this method are shown in Column 1, Table 5.

Substitution of average daily work loads into the first predictor equation, $y^1 = -0.48 + .11x$, yields the predicted mean number of people waiting in each waiting area (Column 2, Table 5). Further compilations according to the steps listed above yield the number of waiting spaces per clinic waiting area (Column 3, Table 5) that should be provided for the proposed new facility to accommodate the

TABLE 5

PREDICTED NUMBER OF WAITING SPACES NEEDED FOR NEW FACILITY,
U.S. ARMY HOSPITAL, FORT CAMPBELL, KENTUCKY

Clinics	Mean Daily Work Load	Mean Number People Waiting	Number of Waiting Spaces Needed (95 Per cent Con- fidence Interval)	Square Feet Needed (95 Per Cent Confidence Interval)
Allergy, Pulmonary Function	7	0.3	2	28 ^b
Dispensary #1	10	0.6	3	42
Urology	18	1.5	6	84
Emergency Room	70	7.2	22	308
Dermatology, Neurology	41	4.0	13	182
General Medicine	37	3.6	12	168
EENT	58	5.9	18	252
General Surgery	34	3.3	11	154
Neuropsychiatry	90	9.4	28	392
Adult Outpatient	254	27.5	80	1120
Orthopedics, Podiatry	84	8.8	26	364
OB-GYN	135	14.4	42	588
Pediatrics	121	12.8	38	532
Outpatient Department ^a	1379	151.2	434	6076

^aThe total outpatient department includes clinics in addition to those surveyed.

^bThe American Institute of Architects recommends a minimum room size of 49 square feet (see literature review).

estimated work load.

The allocation of 14 square feet per waiting space to arrive at the total square footage (Column 4, Table 5) is purely arbitrary other than that it conforms with Department of Defense guidelines. Review of the literature gives some basis for recognizing environmental influence on patients' well-being and behavior, but there is no documented empirically based rationale for making decisions concerning the optimum space per person waiting.⁵

Use of a combination of two predictor equations results in the loss of a few degrees of confidence. However, comparison of the original data (Table 1) with the predicted number of waiting spaces needed shows that only 10, or 5.2 per cent, of the observations fall above the predicted upper boundary for the number of waiting spaces needed.

Further examination reveals that three of these observations occurred in the General Surgery Clinic. This can be explained by the fact that although the Clinic is open from 0730 to 1630 hours daily, appointments are scheduled only after 1000 hours on Tuesdays and Wednesdays, and after 1245 hours on Mondays, Thursdays, and Fridays. Thus, the General Surgery Clinic operates what is essentially an afternoon

clinic. Multiplication of the afternoon work load by two to obtain the equivalent of a full day's work load should, and does, give a more suitable prediction. The above calculation yields a requirement for twenty-one waiting spaces, with two observations still falling above the predicted number of waiting spaces.

Observations in three areas fall far below the predicted number of waiting spaces needed. The reason for this, in both the emergency room and the Adult Outpatient Clinic, is the extremely low work load that occurred in these areas during the survey. There was an average of twenty-six patients seen in the emergency room during normal duty hours (Table 3) as compared with an estimated average of seventy. In the Adult Outpatient Clinic, there was an average of 89 patients seen (Table 3) as compared with an estimated average of 254 patients. The very low numbers of people waiting in the neuropsychiatric waiting area is most likely due to the extensive use of group therapy. Each patient visit is counted as one visit whether he is seen individually or in a group. At Fort Campbell, six groups meet during the week with sessions lasting from 1 to 1 1/2 hours.

Comparison of Waiting Space Requirements:
Predictor Equations vs. DOD Guidelines

A comparison of the waiting spaces needed, as determined by the use of the predictor equations and as determined by DOD guidelines, is shown in Table 6. It must be noted that the predicted number of waiting spaces needed as determined by the two methods are quite similar. A comparison of the number of waiting spaces needed as determined by DOD guidelines with the original observations made at Fort Campbell (Table 1) shows that 7.8 per cent of these observations fall above the predicted spaces.

Although they are somewhat similar, the writer is far more confident of the figures obtained using the method developed in this paper than of the figures obtained through the use of the DOD guidelines. The model developed in this paper is based on data collected at the U.S. Army Hospital, Fort Campbell, Kentucky; thus, the figures obtained have been tailored to fit the requirements of that population. The DOD guidelines provide an overall standard for the determination of waiting spaces but they are not tailored to fit a particular facility.

The method for determining waiting spaces described in this paper is simple enough to be easily updated and

TABLE 6

COMPARISON OF WAITING SPACE REQUIREMENTS:
PREDICTOR EQUATIONS VS. DOD GUIDELINES

Clinics	Predictor Equations		DOD Guidelines	
	Waiting Spaces	Square Feet	Waiting Spaces	Square Feet
Allergy, Pulmonary				
Function	2	28	2	28
Dispensary #1	3	42	2	28
Urology	6	84	4	56
Emergency Room	22	308	23	322
Dermatology,				
Neurology	13	182	9	126
General Medicine	12	168	8	112
EENT	18	252	16	224
General Surgery	11	154	7	98
Neuropsychiatry	28	392	21	294
Adult Outpatient	80	1120	55	770
Orthopedics,				
Podiatry	26	364	18	252
OB-GYN	42	588	43	602
Pediatrics	38	532	43	602

adapted to individual facilities. It merely requires random sampling of one variable, the number of people waiting, simple regression and correlation of the sampling data with the number of patients seen to obtain the predictor equations, and substitution of projected daily work loads into the equations to obtain the number of waiting spaces needed.

The DOD "factors" (Appendix B) are based on a sampling process involving several variables--patients, companions, waiting time, arrival patterns, and so forth. Updating or adapting

these guidelines to an individual facility would require quite an extensive sampling process which is not likely to be either economically feasible or timely.

Actual Waiting Space Allocations

The "Utilization and Requirement Study" developed by OTSG for the new facility at Fort Campbell recommends space allocations for waiting rooms as shown in Table 7.⁶

In anticipation of a change in the demographic mix of the population at Fort Campbell, the "Utilization and Requirement Study" is based on data collected from three populations similar to the expected population rather than data collected at Fort Campbell. In some instances the DOD guidelines were used, based on the above work loads. For some clinics, however, allocations were apparently made, based on other than empirically determined guidelines. There is insufficient information available to allow for a meaningful critique of the number of waiting spaces allocated by OTSG's study.

Summary

A random sample of the number of people waiting in thirteen clinics at the U.S. Army Hospital, Fort Campbell, the clinic is not in session.

TABLE 7

WAITING SPACE REQUIREMENTS AS DETERMINED BY
OTSG "UTILIZATION AND REQUIREMENT STUDY"

Clinic	Waiting Spaces	Square Feet
Medical Specialty		
Allergy, Pulmonary Function, Dermatology, Neurology	-- ^a	500
General Surgery	41 ^b	600
Urology		
General Outpatient/Family Practice	49	685
Emergency Room	--	150
General Medicine	--	680 ^c
EENT	50	700 ^d
Neuropsychiatry	22	310
Orthopedics, Podiatry	48 ^e	700
OB-GYN	--	900
Pediatrics	56	1295 ^f

^a Blank spaces indicate that DOD guidelines were not used.

^b Includes two wheelchair spaces at 25 square feet.

^c Includes a 180 square foot subwaiting area for Cardiology.

^d Includes two 5 square foot subwaiting areas.

^e Includes four wheelchair spaces at 25 square feet.

^f Includes a 100 square foot isolation waiting area, a 110 square foot play area, and a 400 square foot waiting area for Well-Baby Clinic. The Well-Baby Clinic waiting area is to be used as a conference room when the clinic is not in session.

Kentucky, was obtained over a one-week period. The mean number of patients waiting was then correlated with the mean number of patients seen for the same time period in an attempt to determine the validity and reliability of using the projected clinic work load as a predictor of the number of waiting spaces needed.

Footnotes

¹John E. Freund and Frank J. Williams, Elementary Business Statistics: The Modern Approach (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1964), pp. 296-318.

²Lecture given by Captain Donald N. Soderberg, Assistant Professor of Health Care Administration, Health Care Administration Division, Academy of Health Sciences, U.S. Army, Ft. Sam Houston, Texas, Fall, 1972.

³Rose Interview.

⁴Freund and Williams, p. 444.

⁵William V. Griffin, Joseph H. Mauritzen, and Joyce V. Kasmar, "The Psychological Aspects of the Architectural Environment: A Review," American Journal of Psychiatry, CXXV (February, 1969), 1061.

⁶Telephone interview with 1 Lt Ronald W. Lowery, Medical Facility Planner, Facilities Branch, Logistics and Facilities Division, Office of the Surgeon General, January, 1974.

CHAPTER III

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusion of this study is that the number of patients seen in a clinic is a valid and reliable predictor of the number of waiting spaces needed. Furthermore, the model developed by this study is based on data collected at the U.S. Army Hospital, Fort Campbell, Kentucky; and, as a result, yields predictions for the number of waiting spaces needed that have been tailored to meet the requirements of that population.

Recommendations

It is recommended that the number of waiting spaces allocated by the OTSG "Utilization and Requirement Study" for the new facility for the U.S. Army Hospital, Fort Campbell, Kentucky, be re-evaluated utilizing the model developed by this study. In addition, it is recommended that the method for determining waiting space requirements as described in this paper be utilized by facility planners when designing waiting rooms for ambulatory care clinics.

DEFINITION OF TERMS

To facilitate the reading of this study the following definitions are included:

Adult outpatient clinic.--the entry clinic for adults other than active-duty males at U.S. Army Hospital, Fort Campbell.

Ambulatory care.--care given to a patient who does not require lodging while in the hospital. Includes physician, dental, or ancillary services at a hospital.

APPENDIX A

DEFINITION OF TERMS

Ancillary services.--special diagnostic and treatment services other than clinic services to include laboratory, radiology, pharmacy, and physical and occupational therapy services.

Clinic.--a medical or dental service established for the diagnosis and treatment of ambulatory patients.

Clinic waiting area.--an area where patients (and companions) for one or more clinics wait until served by the clinic.

Clinic waiting space.--the area needed to accommodate one person waiting to be served by a clinic.

Outpatient department.--the department serving patients

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Clinic waiting space.--the area needed to accommodate one person waiting to be served by a clinic.

Outpatient department.--the department serving patients

who are not lodged in a hospital while receiving medical, dental, or ancillary services.

Troop clinic--the entry or sick-call clinic for male active-duty personnel at Fort Campbell. (Female active-duty personnel are cared for in the Adult Outpatient Clinic.)

APPENDIX B

DEPARTMENT OF DEFENSE GUIDELINES

FOR DETERMINING WAITING SPACES

Waiting Space

1. Exam and Treatment Areas--Includes exam rooms, treatment rooms, and special testing rooms (i.e., eye lanes, ECG rooms, audio booths, etc.).

2. The wheelchair and litter spaces are counted as part of the total calculated waiting spaces. The ratio of wheelchair-litter spaces to regular seats will be determined by a sample survey of existing facilities.

APPENDIX B

3. Podiatric Clinic--The factor 4.3 is based on an average of 1.3 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 50 per cent for extended waiting, parking, and flexibility;
 $2.2 \times 1.50 \times 1.90 = 4.3.$

4. OB-GYN Clinic--The factor 3.5 is based on an average of 0.55 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 50 per cent for extended waiting, parking and flexibility;
 $1.35 \times 1.50 \times 1.90 = 3.5.$

5. Psychiatric Clinic--The examination offices include the office of physicians, clinical psychologists, social workers, technicians who interview or test patients, and observation rooms. The factor 2.9 is based on an average

Waiting Space

1. Exam and Treatment Areas include exam rooms, treatment rooms, and special testing rooms (i.e., eye lanes, ECG rooms, audio booths, etc.).

2. The wheelchair and litter spaces are counted as part of the total calculated waiting spaces. The ratio of wheelchair-litter spaces to regular seats will be determined by a sample survey of existing requirements.

3. Pediatric Clinic--The factor 4.3 is based on an average of 1.2 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 30 per cent for extended waiting, peaking, and flexibility;

$$2.2 \times 1.50 \times 1.30 = 4.3.$$

4. OB-GYN Clinic--The factor 3.8 is based on an average of 0.33 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 90 per cent for extended waiting, peaking and flexibility;

$$1.33 \times 1.50 \times 1.90 = 3.8.$$

5. Psychiatric Clinic--The examination offices include the office of physicians, clinical psychologists, social workers, technicians who interview or test patients, and observation rooms. The factor 2.9 is based on an average

of 0.5 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 30 per cent for extended waiting, peaking and flexibility;

$$1.5 \times 1.50 \times 1.30 = 2.9.$$

6. Allergy Clinic--The examination rooms and skin-testing cubicles are used in the calculation of waiting spaces required in the Medical Specialty Clinic using the formula listed for Other Clinics. In addition to the above waiting space, spaces are required to wait an average of twenty minutes after an allergy injection for observations. The allergy injection stations are calculated based on thirty-five injections per hour resulting in an average of twelve patients waiting after injections.

7. Immunization Clinic/Room--Twelve patients waiting in the area following immunization is based upon an average of fifteen to twenty minutes for observation.

8. Physical Examination Clinic--The physical examinations per day are determined by totaling the total physicals, the limited physicals, and the screening physicals. On the average, two groups per day are normally processed through an examination center. This waiting space is also for orientation and completion of forms.

1.33 x 9. Eye Clinic--The factor 3.9 is based on an average of one companion with each patient, an allowance of 50 per cent for early arrivals and an allowance of 30 per cent for extended waiting, peaking, and flexibility;
 $2 \times 1.50 \times 1.30 = 3.9.$

10. Emergency Clinic--This factor applies only when the "true emergency" work load justifies a separate emergency clinic. The factor 3.9 is based on the patient not waiting, an average of two companions with each patient, an allowance of 50 per cent for peaking, and an allowance of 30 per cent for extended waiting, and flexibility;
 $2 \times 1.50 \times 1.30 = 3.9.$

11. Aerospace-Submarine Medicine Clinic--The factor 2.1 is based on an average of 0.1 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 30 per cent for extended waiting, peaking, and flexibility;
 $1.1 \times 1.50 \times 1.30 = 2.1.$

12. Other Clinics--The factor 2.6 is based on an average of 0.33 companions with each patient, an allowance of 50 per cent for early arrivals and an allowance of 30 per cent for extended waiting, peaking and flexibility;

$$1.33 \times 1.50 \times 1.30 = 2.6.$$

Source: "Design and Planning Criteria for Nonspecialized Army Health Facilities." Prepared for the Research and Development Command, OTSG, DA, by Medical Planning Associates, Malibu, California, 1965.

ing the monthly average by twenty-eight work days per month.

3. Divide the average daily work load by twenty-eight to determine the number of physicians needed. (Each physician is programmed for a seven-day workday with appointments scheduled every fifteen minutes.)

4. Determine the number of work stations by allocating two examination rooms per physician, and one treatment room per six examination rooms. A work station is equivalent to two examination rooms to one treatment room.

5. Multiply the number of work stations by the factor given in the guidelines to determine the number of waiting spaces required. (Normally, 10 square feet is allowed per waiting space--15 square feet for wheelchair space.)

Source: Hunt and Doney, *unpublished*.

Steps in the Manipulation of Department of Defense
Guidelines for Determining Waiting Spaces

1. Determine the average monthly clinic work load by averaging the high nine of the proceeding twelve months.
2. Determine the average daily work load by dividing the monthly average by twenty-two work days per month.
3. Divide the average daily work load by twenty-eight to determine the number of physicians needed. (Each physician is programed for a seven-hour workday with appointments scheduled every fifteen minutes.)
4. Determine the number of work stations by allocating two examination rooms per physician, and one treatment room per six examination rooms. A work station is equivalent to two examination rooms or one treatment room.
5. Multiply the number of work stations by the factor given in the guidelines to obtain the number of waiting spaces required. (Normally, 14 square feet is allowed per waiting space--25 square feet per wheelchair space.)

Source: Haas and Dowery interviews.

DEPARTMENT OF THE ARMY
OFFICE OF THE SURGEON GENERAL
Washington, D. C. 20314

OTSG Memorandum
No. 40-2

5 June 1972

Medical Services
COORDINATED PLAN OF IMPROVEMENT ACTIONS IN
AMBULATORY CARE

1. REFERENCE. Report, Seminar on Ambulatory Health Care Services.

2. PURPOSE. The purpose of this memorandum is to assign responsibilities to Directorates and Agencies of this Office to accomplish specific tasks within the time frames indicated toward the goal of improving ambulatory health services in the AMEDD.

APPENDIX C

DIRECTIVES CONCERNING AMBULATORY CARE

FROM THE OFFICE OF THE SURGEON

GENERAL, DEPARTMENT OF THE ARMY

3. RESPONSIBILITIES. The Director, Plans, Supply and Coordinate the actions outlined in the appendix. He will receive and review all reports prepared by Agencies to the Director, Professional Services, and will follow on actions should be taken. In addition he will designate an action officer for the coordination of this plan and provide the action officer's name to all other agencies involved.

4. All Directorates, Services and/or Agencies assigned tasks in this memorandum will:-

- (1) Designate a primary action officer for each project assigned and furnish the Director, PS&C the name within 30 days after receipt of this memorandum.
- (2) Make every effort to meet response dates established for each project.
- (3) Coordinate with other OTSG Directorates and Offices where it is evident that coordination is necessary.
- (4) Keep the Director, PS&C informed of any occurrences affecting the progress of each project such as unexpected delays, early completion dates, initiation of test phases.

5. POLICIES. a. Investigation, study and test phases of assigned projects will be completed within the manpower resources available to the AMEDD. Projects considered feasible for implementation will be prepared in staff study format.

DEPARTMENT OF THE ARMY
OFFICE OF THE SURGEON GENERAL
Washington, D. C. 20314

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2. PURPOSE. The purpose of this memorandum is to assign responsibilities to Directorates and Agencies of this Office to accomplish specific tasks within the time frames indicated toward the goal of improving ambulatory health services in the AMEDD.
3. RESPONSIBILITIES. a. The Director, Plans, Supply and coordinate the implementation of the tasks outlined in the appendix. He will receive and review all reports prepared by Agencies tasked herein and in consultation with the Director, Professional Services determine what follow-on actions should be taken. In addition he will designate an action officer for the coordination of this plan and provide the action officer's name to all other agencies involved.

b. All Directorates, Services and/or Agencies assigned tasks in this memorandum will--
 - (1) Designate a primary action officer for each project assigned and furnish the Director, PS&O the name within 30 days after receipt of this memorandum.
 - (2) Make every effort to meet suspense dates established for each project.
 - (3) Coordinate with other OTSG Directorates and Offices where it is evident that coordination is necessary.
 - (4) Keep the Director, PS&O informed of any occurrence affecting the progress of each project such as unexpected delays, early completion dates, initiation of test phases.
4. POLICIES. a. Investigation, study and test phases of assigned projects will be completed within the manpower resources available to the AMEDD. Projects considered feasible for implementation will be prepared in staff study format,

appropriately staffed and submitted through PS&O to The Surgeon General for approval.

b. Field tests, if considered necessary, may be conducted after approval has been obtained from the hospital commander and a formal clearance is obtained from the Commanding General, Continental Army Command in the case of Class 1 hospitals. The Director, PS&O will be kept informed of anticipated field tests.

c. Coordination will be effected with other federal medical services and civilian agencies to determine if systems already exist which can be adopted for AMEDD use.

d. Project planning, feasibility determinations and execution should be guided by the realities of a reduced force structure and a diminution of AMEDD manpower resources. To the maximum extent possible, new programs should require the same or fewer resources. If additional resources are required, attempts will be made to identify trade offs. If no trade offs can be identified and The Surgeon General grants concept approval, the responsible agency will coordinate with RMD on the preparation of a Program Change Request.

e. TDY and other funds required to accomplish assigned projects will be provided by RMD as deemed appropriate.

f. Data processing support and/or guidance will be provided by the information Systems Office.

g. Projects will be terminated by one of the following ing methods:

(1) Completed study, concept approval by The Surgeon General and program implementation.

(2) Completed study approved by The Surgeon General which produces a recommendation that the program not be implemented.

h. Investigate and prepare a report on the advisability of constructing "Medical Arts Building" physically separated from hospitals which would be used as physicians offices and clinic facilities. 31 Aug 72.

i. Investigate in coordination with Professional Services the feasibility of more extensive purchases of prepackaged drugs. Initial report - 30 Sep 72.

APPENDIX
TASK ASSIGNMENTS

1. PLANS, SUPPLY & OPERATIONS DIRECTORATE. a. Coordinate all activities regarding this plan for The Surgeon General.

b. Investigate methods which will result in more efficient administrative support to professional elements in the ambulatory care setting. S: 31 Aug 72.

c. Coordinate the preparation of proposed changes to DA Pam 616-557 in the ambulatory care area. S: 31 Aug 72.

d. Identify and coordinate the action required to determine the desirability, feasibility, and best method of implementing the problem oriented medical and dental record in the AMEDD. S: 30 Sep 72. Under the provisions of OTSG Memo 15-44 a Steering Committee has been appointed to provide guidance on this project.

e. Initiate action through appropriate DOD agencies to establish one machine readable embossed, all purpose ID card for eligible categories of personnel. S: 31 Aug 72.

f. Evaluate the 71G MOS with regard to grade structure potential expanded roles, with a view toward increasing career attractiveness. Necessary coordination with P&T Directorate will be effected at appropriate milestones. S: Initial Progress Report 30 Sep 72.

g. Implement on a trial basis and evaluate in several representative hospitals the resident manager concept using exchange carts, providing 24 hour/day, 7 day/week service. S: Implementation Plan - 30 Sep 72.

h. Investigate and prepare a report on the advisability of constructing "Medical Arts Building" physically separated from hospitals which would be used as physicians offices and clinic facilities. S: 30 Sep 72.

i. Investigate in coordination with Professional Services the feasibility of more extensive purchases of prepackaged drugs. Initial report - S: 30 Sep 72.

j. Investigate and report on the feasibility and desirability of using surgicenters in AMEDD ambulatory care facilities. Close coordination should be effected with Professional Services Directorate. S: 30 Sep 72.

2. PROFESSIONAL SERVICES DIRECTORATE. a. Consider reorganization of Department of Clinics and Community Health Care Services with a view toward insuring greater emphasis in ambulatory care. S: Preliminary Report on 31 Jul 72.

b. Insure that only well qualified, highly motivated Medical Corps officers are chosen to fill key ambulatory health care positions. S: Immediately.

c. Identify modular elements of the AMOS project which have potential for early implementation in AMEDD health care facilities. Prepare a proposed plan for this implementation to include the method by which these modular elements could be transposed into a functional health care setting and the criteria which must be met to insure successful exportation. S: 30 Sep 72.

3. PERSONNEL & TRAINING DIRECTORATE. a. Insure that only the most qualified highly motivated MSC's and ANC's are chosen to fill key ambulatory health care positions. S: Immediately.

b. Coordinate with all other interested OTSG elements on an in depth review of all MFSS officer and enlisted course POI's. Identify and implement changes to strengthen instructional hours in records maintenance, expanded roles of non-professionals for the emergency room, troop clinics and triage clinics; philosophy and objectives of AMEDD in delivery of care to ambulant patients and interpersonal relations and skill training in "humanizing ambulatory care." S: 31 Jul 73, First Progress Report - 31 Jul 72.

4. HEALTH & ENVIRONMENT DIRECTORATE. a. Review and evaluate multiphasic screening systems. Consider the feasibility of the possible purchase, installation and testing of a selected system as soon as possible. S: Preliminary Feasibility Report - 30 Sep 72.

b. Investigate the expansion of the Army Health Nurse role to include the provision of consultative services in

outpatient areas and the possible use of enlisted technicians to assist with home care programs. Additionally, investigate the use of mobile health vans and determine the advisability of more extensive use in connection with AHN activities.

S: 30 Sep 72.

5. ASSISTANT SURGEON GENERAL FOR DENTAL SERVICES. Evaluate training, grade structure and career patterns for dental assistants, clinical dental hygienists, community oral health managers and dental laboratory technicians. S: Initial progress report 30 Sep 72.

6. BROOKE ARMY MEDICAL CENTER. Action has already been taken to initiate the following projects at Brooke Army Medical Center.

- a. Study the impact of eliminating scheduled sick call.
- b. Evaluate experimental staffing of troop medical clinics with male nurses, nurse clinicians or physician assistants.
- c. Study centralized versus decentralized appointment systems.
- d. Study the integration of the expanded duty dental assistant into dental service operations.
- e. Study methods of control over records flow between various medical activities.
- f. Study the use of fixed health care clinics and/or mobile health vans to provide health maintenance services in dependent housing areas and elsewhere.
- g. Prepare an operational guide for ambulatory health services.

51

DASG-DDD-H (30 May 72)

FOR THE SURGEON GENERAL:



THOMAS H. KORTE
Major, MSC
Adjutant

29 August 1972

DISTRIBUTION:

B

1. By direction of the Chief of Staff, the Comptroller of the Army (COA) recently completed an analysis of the AMEDD CONUS Outpatient Care System. The study team concluded that an immediate improvement can be achieved by two actions:

a. Ambulatory health care be given a higher priority for personnel assignment, equipment acquisition and facility improvement within the total health care delivery system.

b. Greater emphasis be placed on ambulatory health care commensurate with the increase in work load in ambulatory care and the decline of work load in inpatient hospital care.

2. Commanders will insure the delivery of high quality care to the ambulatory patient in a manner which is acceptable to patients and the hospital staff. This would appear to necessitate several actions, not the least of which is a reorientation in thinking as well as resources. Therefore as a minimum, commanders will personally insure that the following actions are taken immediately:

a. Adequate numbers of professional, technical and administrative personnel are assigned to ambulatory health care in order to reduce the backlog of appointments, patient waiting time to see a physician or other allied health personnel and to allow retrieval of outpatient treatment records in a minimum time commensurate with high quality care.

b. The Chief, Department of Clinics and Community Health Care Services as directed in OTSG Reg 18-2 operate a central

DEPARTMENT OF THE ARMY
Office of the Surgeon General
Washington, D.C. 20314

DASG-DDD-H

29 August 1972

SUBJECT: Improvement of Outpatient Health Care

SEE DISTRIBUTION:

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2. Commanders will insure the delivery of high quality care to the ambulatory patient in a manner which is acceptable to patients and the hospital staff. This would appear to necessitate several actions, not the least of which is a reorientation in thinking as well as resources. Therefore as a minimum, commanders will personally insure that the following actions are taken immediately:

a. Adequate numbers of professional, technical and administrative personnel are assigned to ambulatory health care in order to reduce the backlog of appointments, patient waiting time to see a physician or other allied health personnel and to allow retrieval of outpatient treatment records in a minimum time commensurate with high quality care.

b. The Chief, Department of Clinics and Community Health Care Services as directed in OTSG Reg 10-2 operate a central

appointment system for all clinics. In the event a central appointment system is determined to be incompatible with the provision of quality patient care in selected clinics, a request for exception to the policy stated in OTSG Reg 10-2 will be submitted by the commander to HQDA (DASG-DDF), WASH, DC 20314.

c. Administration and control of outpatient treatment records are transferred to the Chief, Department of Clinics and Community Health Care Services. A change to OTSG Reg 10-2 and DA Pam 616-557 is being processed to reflect this required action.

d. Personnel of the highest caliber are selected to fill supervisory positions in outpatient care. All personnel performing duties in outpatient care areas must be properly trained and supervised to insure that patients are treated in a courteous and attentive manner and that appearance, demeanor and mannerism is such that an atmosphere of professionalism prevails.

e. Within existing resources a high priority is placed on equipment and materiel requirements in outpatient clinics and supportive areas. Allocations of facilities used in support of the outpatient should be reviewed with a goal of properly matching patient work load with resources. Progress will be made by, increasing available clinic space through smoothing patient arrivals, proper use of the central appointment system, expansion of clinic hours and possible use of space previously occupied by inpatients.

3. By your prompt attention to the matters discussed in this correspondence we can substantially improve ambulatory care. I am confident that the AMEDD will meet the challenge with the same positive action which has traditionally been present over the years. It is anticipated that a rapid and significant improvement can be demonstrated.

4. Specific actions delineated in this correspondence will be made a matter of special interest in future Inspector General inspections. In addition a onetime report will be submitted NLT 29 September 1972 under RCS MEDDD--(ot)--371 to HQDA (DASG-DDD-H), WASH DC 20314. The report will state

what actions have been taken in response to this directive as well as comments regarding future related improvements which can be accomplished.

/s/ Hal B. Jennings, Jr.
HAL B. JENNINGS, Jr., M.D.
Lieutenant General
The Surgeon General

DISTRIBUTION:

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Pa 19460
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30330

SERIES

SIMPLE REGRESSION

T = X OR Y

DATE/TIME: 10/08/87

X AND Y ARE VECTORS GIVING THE (N=10) NUMBER OF OBSERVATIONS ON AN INDEPENDENT VARIABLE X AND A DEPENDENT VARIABLE Y. Y IS A MATRIX WITH 5 ROWS AND 3 COLUMNS CONTAINING THE RESULTS OF A MATRIX WITH 5 ROWS AND 3 COLUMNS CONTAINING THE RESULTS OF FITTING THE STRAIGHT LINE $Y=A+BX$ BY THE METHOD OF LEAST SQUARES IN THE FOLLOWING FORMAT:

ROW 1: MEAN OF X, ST DEV OF X, 0
 ROW 2: MEAN OF Y, ST DEV OF Y, 0
 ROW 3: A, 0, 0
 ROW 4: B, ST ERROR OF B, Y-VALUE
 ROW 5: ST ERROR OF ESTIMATE, R-SIMPLE CORR COEFF, R².
 ROW 6: ST ERROR OF ESTIMATE, R-SIMPLE CORR COEFF, R².

CLEAR WS

APPENDIX D

COPY 2 STEP 2

SAVED 14.14.25 11/02/71

COMPUTER PRINT-OUT: SIMPLE CORRELATION

AND REGRESSION ANALYSIS

```

* X = 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0
Y = 14.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
X OR Y
56.95384615 46.21934327 0
5.980760231 5.385994897 0
0.4996917427 0 0
0.1130088502 0.0076182404 14.52138845
1.251997608 0.0749222856 0.760473459
CALC .09 3.45 2.39 3.64 3 4.72 5.36 2.40 7.16 11.83 19.94 11.87
X OR C
56.95384615 46.21934327 0
6.373946154 5.59698362 0
0.2640218109 0 0
0.1063983605 0.01743443634 0.1027589953
2.70140148 0.878631783 0.7719931072
DA 2.4 1.80 2.43 1.96 3.27 3.74 3.44 7.23 1.86 5.51 8.51 13.44 8.05
X OR D
56.95384615 46.21934327 0
4.746615345 4.271632769 0
0.1270980273 0 0
0.08101067753 0.01338820048 0.054635771
2.143094719 0.877033751 0.7691917787
Y OR C
5.980760231 5.385994897 0
6.323946154 5.59698362 0
0.6690477138 0 0
0.3453465196 0.1301055208 7.26288597
2.4274617 0.8097027676 0.8275718614

```

¹Standard deviations. ²Mean deviations

SRHOW

SIMPLE REGRESSION

T ← X SR Y

ENTERED:10/08/67

X AND Y ARE VECTORS GIVING THE (SAME NUMBER OF) OBSERVATIONS
ON AN INDEPENDENT VARIABLE X AND A DEPENDENT VARIABLE Y. T IS
A MATRIX WITH 5 ROWS AND 3 COLUMNS CONTAINING THE RESULTS OF
A MATRIX WITH 5 ROWS AND 3 COLUMNS CONTAINING THE RESULTS OF
FITTING THE STRAIGHT LINE $Y=A+BxX$ BY THE METHOD OF LEAST SQUARES
IN THE FOLLOWING FORMAT:

ROW 1: MEAN OF X, ST DEV OF X, 0
ROW 2: MEAN OF Y, ST DEV OF Y, 0
ROW 3: A, 0, 0
ROW 4: B, ST ERROR OF B, T-VALUE
ROW 5: ST ERROR OF ESTIMATE] R=SIMPLE CORR COEFF, R*2.
ROW 5: ST ERROR OF ESTIMATE, R=SIMPLE CORR COEFF, R*2.

CLEAR WS

COPY 2 STP 2

SAVED 14.14.25 11/02/71

X ← 3.6 10.2 20 26 33.6 35 41.6 44 57.8 89.4 96.8 138.8 143.6

Y ← .14 .60 1.93 1.86 2.87 2.8 6.2 6.2 3.42 8.93 11.73 14.87 16.2

X SR Y

56.95384615	46.21934327	0
5.980769231	5.385994897	0
0.4896917427	0	0
0.1136088502	0.00781924504	14.52938865
1.251927608	0.9749222836	0.950473459
C ¹ 1.36 .99	3.63 2.29 4.64 3 4.72 9.38 2.40 7.16 11.83 19.94 11.87	

X SR C

56.95384615	46.21934327	0
6.323846154	5.59698362	0
0.2640218199	0	0
0.1063988605	0.01743443634	6.102798993
2.79140148	0.878631383	0.7719931072
D ² 2.24 .80 2.43 1.96 3.27 2.24 3.44 7.23 1.86 5.51 8.31 15.44 8.95		

X SR D

56.95384615	46.21934327	0
4.744615385	4.271856769	0
0.1278980273	0	0
0.08106067753	0.01338820048	6.054635771
2.143564719	0.877035791	0.7691917787

Y SR C

5.980769231	5.385994897	0
6.323846154	5.59698362	0
0.6699477338	0	0
0.9453463596	0.1301055508	7.265995597
2.4274617	0.9097097676	0.8275718614

¹Standard deviations. ²Mean deviations

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ABSTRACT

BIOGRAPHICAL SKETCH

Captain Nancy R. Ashley [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]

[REDACTED]. In May, 1957, she graduated from Mars Hill College, Mars Hill, North Carolina, at that time a junior college. In September, 1961, she graduated from the North Carolina Baptist Hospital School of Nursing and Wake Forest University, Winston-Salem, North Carolina, receiving both a Diploma in Nursing and a Bachelor of Science degree. Later that year she received a license as a registered nurse from the state of North Carolina.

Captain Ashley has held civilian positions in Fort Worth, Texas; Jefferson, North Carolina; and Charlotte, North Carolina. In April, 1967, she received a direct commission as a captain in the Army Nurse Corps. Her stateside assignments include: Fitzsimons General Hospital, Colorado, and Fort Sam Houston, Texas. In addition, she has had one overseas tour at SHAPE, Belgium. Captain Ashley has been awarded the Army Commendation Medal with Oak Leaf Cluster.

On August 20, 1972, she entered the U.S. Army-Baylor University Program in Health Care Administration. Following a one-year residency at the U.S. Army Hospital, Fort Gordon, Georgia, she received a Master's degree in Hospital Administration, in August, 1974, from Baylor University.