PERCEPTIONS OF MEMBERS OF THE HEALTH TEAM IN SECTARIAN AND NON-SECTARIAN HOSPITALS

Thesis for the Degree of Ph. D.
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SISTER MARY ROSARII SAUNDERS L.C.M.
1969

THESIS

This is to certify that the

thesis entitled

PERCEPTIONS OF MEMBERS OF THE HEALTH TEAM IN SECTARIAN AND NON-SECTARIAN HOSPITALS

presented by

Sister M. Rosarii Saunders L.C.M.

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ABSTRACT

PERCEPTIONS OF MEMBERS OF THE HEALTH TEAM IN SECTARIAN AND NON-SECTARIAN HOSPITALS

by Sister Mary Rosarii Saunders L.C.M.

Purpose of the Study

This study was concerned with the perception of nurses and medical technologists in sectarian and non-sectarian hospitals. In order to study the perceptions an instrument called the Professional Perception Index was developed by the author. The 27 variables of this index were divided into three groups, activities, sentiment and interaction, according to Homans Model.

The purpose of this study is to determine whether or not there is a difference in the perceptions held by nurses and medical technologists of the necessary characteristics of other health professionals for effective team functioning.

It is hypothesized that,

> Health professionals differ in perceptions of their own professional role, individually and collectively, as well as other health professionals with whom they work, individually and collectively.

Design of the Research

The Professional Perception Index was developed to measure the perceptions of nurses and medical technologists in sectarian and non-sectarian hospitals. The sample consisted of 75 nurses and 75 medical technologists randomly selected from four mid-Western hospitals.

Results

On the basis of this data, nurses and medical technologists have different perceptions of the activities, interaction and sentiment of medical doctors, medical technologists and nurses as indicated by the Professional Perception Index. The greatest differences in the perceptions of nurses and medical technologists occur in the ratings of nurses and medical doctors. The difference in the rating of nurses by nurses and medical technologists is statistically significant at the .01 level or 99 per cent level of confidence. The difference in the rating of medical doctors by nurses and medical technologists is statistically significant at the .05 level or 95 per cent level of confidence. Although not statistically significant, the ratings of medical technologists by nurses and medical technologists cannot be ignored since this 70 per cent level of confidence does indicate a difference.

On the basis of this data, the more years of formal schooling a medical technologist had, the higher she ranked

nurses especially in the categories of activities (.05 level) and interaction (.01 level). Years of formal schooling appeared to have no effect on the perceptions of nurses.

The experience of medical technologists appeared on the basis of this data to have an influence on their perceptions of nurses especially in the categories of nurses' activities and interaction (significant to the .05 level). The experience of nurses did not appear to significantly effect their perceptions of medical doctors, nurses or medical technologists.

The differences in age of medical technologists did not appear to significantly alter their perceptions of medical doctors, medical technologists and nurses according to the Professional Perception Index. Although differences in the age of nurses did not alter their perceptions of medical doctors or nurses, age differences of nurses did appear to significantly effect their perceptions of medical technologists. These differences were statistically significant to the .05 level or 95 per cent level of confidence.

Implications

Information concerning the differences in perceptions of nurses and medical technologists can give direction to in-service educational programs as well as to the various programs of health education in the colleges and universities.

In addition, this study may shed light on the communications process and conflicts among health professionals. Such information could lead to early indoctrination of students in the interdisciplinary health team approach. Through common education and training experience the groundwork would have begun for eventual mutual understanding and hopefully better cooperation among allied health personnel when they work together.

In view of the limitations of the study, perhaps future research could be done by utilizing nurses and medical technologists from other geographic areas. The instrument developed in this research might be used in studies of the perceptions of other health professionals, such as radiologic technologists, dieticians, occupational therapists and operating room technicians.

Further studies of salaries of health professionals and their perceptions of such salaries may contribute to harmonious functioning of the health team.

PERCEPTIONS OF MEMBERS OF THE HEALTH TEAM IN SECTARIAN AND NON-SECTARIAN HOSPITALS

By

Sister Mary Rosarii Saunders, L.C.M.

A THESIS

Submitted to
Michigan State University
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"Clinical Laboratory Assistants Training Upgraded." Published in Illinois Vocational Progress, Nov., 1966

"Training Program Will Provide New Lab. Worker: The C.L.A." Published in Hospital Topics Magazine, October, 1964

"Calcium & Phosphorous Metabolism in Rana Ripiens." Unpublished Thesis for Masters Degree

DEDICATION

To my religious community

The Sisters of Little Company of Mary.

An eternally welcomed source of love, support, and inspiration. . . .

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I would like to acknowledge the encouragement and professional direction given to me by the members of my guidance committee: Dr. C. Blackman, Dr. H. Jason, Dr. V. Johnson, Dr. M. Raines. Particular acknowledgment is given to Dr. Laurine Fitzgerald, who has served as the chairman of this dissertation committee and has been of invaluable assistance as the major advisor for this research. It has been through her patience, understanding and insights that this project has reached its conclusion.

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CHAPTER I

STATEMENT OF THE PROBLEM

The Expanding Horizons of Medical Knowledge

The marked proliferation of scientific knowledge, coupled with the rapid expansion in health care services, has increased the demand for health manpower, particularly in the technical areas related to health care delivery.

> In 1900 there were 60 health profession workers for each physician--today the ratio is one to 400.[1]

In the fifteen years from 1950 to 1965, while the number of physicians increased by 20 per cent, the number of clinical laboratory personnel rose by 70 per cent. While the number of dentists increased by 15 per cent, the number of dental hygienists expanded by 54 per cent.

Frederick C. Mosher[2] has shown that there has been a consistent increase in the number of professionals. Between 1900 and 1960 he states that the American labor force grew about 123 per cent while the numbers in professional

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[1] L. T. Coggeshall, Planning for Medical Progress Through Education (Evanston, Illinois: Association of American Medical Colleges, 1967).

[2] Frederick C. Mosher, The Professions, Professional Education, and the Public Service (San Francisco: Chandler Publishing Company, 1968).

occupations multiplied by 485 per cent. The United States Public Health Service[3] reports that in 1967 there were 3.4 million people in health occupations and this figure comprised a gain of one-half million in the allied health occupations since 1965.

The Greater Productivity Demand

The rapid growth of health care services demands greater physician productivity. This requires delegating routine tasks, now performed by physicians, to other health professionals and technologists. Not only will physicians have to delegate tasks to others, but dentists, nurses, pharmacists and many other health professionals will find it necessary to delegate to others several of their present responsibilities.

It is imperative that individuals with various kinds of knowledge and differing levels of skill are educated and trained for the expanding delivery of health care. It is observed that:

> The "allied" health occupations include a broad range--perhaps every group beyond medicine and dentistry.[4]

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[3] U. S. Department of Health, Education and Welfare, Health Manpower - United States 1965-67, Public Health Service Publication, 1000 Series 14, Number 1 (Washington D.C.: U. S. Government Printing Office, 1968).

[4] Report of the Allied Health Professions Education Subcommittee of the National Advisory Health Council, Education for the Allied Health Professions and Services, Public Health Service Publication Number 1600 (Washington D. C.: U. S. Government Printing Office, 1967) p. 1.

Delegation of responsibility, the development of new allied health occupations by physicians and technological advances have contributed to the precipitation of the "team" concept in health care. Because the team demands cooperation, collaboration, and a free flow of communication, its members must understand and appreciate the contributions of one another. In an age of intensive specialization, each of the health professions has developed its own technological society and professional organization. Because communication is primarily within the individual profession, rather than between professions, there are increasing chasms that tend to isolate one profession from another. In fact, at times, members of one health profession find themselves in direct conflict with members of another health profession.

As health professionals are aware, growth and maturity of all organisms depend upon the heritage with which they are endowed and upon the environment from which they obtain their sustenance. To each of these ambients adaptation must be made continually. Neither inheritance nor adaptability to environment alone will assure mature growth. Each ambient must be present.[5]

Geoffrey Millerson[6] has noted that of all the sociological concepts one of the most difficult to analyze is

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[5]William K. Selden, "Just One Big Happy Family," American Journal of Medical Technology, 35-36 (June, 1969), 357.

[6]Geoffrey Millerson, The Qualifying Associations - A Study of Professionalization, (London: Rutledge and Kegan, Paul, 1964).

that of a profession. He points out that the wide and indiscriminate use of the word has led to much confusion. Furthermore, attempts to delineate fundamental characteristics of a profession and to apply them to all professional associations encounter structural limitations and do not allow sufficiently for the dynamic changes which are occurring in all organizations.

Despite these admonitions Millerson and others have identified certain characteristics which are commonly accepted hallmarks of a profession. These essential features include: (1) skill based upon theoretical knowledge, (2) skill requiring education and training, (3) demonstration of competence by the passing of a test, or tests, (4) integrity maintained by adherence to a code of conduct, (5) service provided for the public good, and, (6) organization of practitioners into a body, the professional association.

Williams[7] describes the inter-relation of members of different professions working together for the solution of a problem that in some way demands the attention of a number of persons that are skilled in the various areas of the science-art of healing, especially when the combined skills of the various members of the "team," are focused on the problem of healing the affliction of a hospitalized patient:

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[7] Williams, Donald H., M.D., Director of Division of Continuing Education, Health Science Center, University of British Columbia, Vancouver, Canada, lecturing, "Professional Competence and Obsolescence," Royal Victoria Hospital, Ireland, May 7, 1969.

> . . . a health team is a group of health professionals with their associated technologists, technicians and other essential staff personnel. The functions of this team are the promotion of health, the prevention of disease, diagnosis and treatment of illness, and the alleviation of suffering. Cooperation, coordination and integration of efforts provide health care that embraces all relevant knowledge, skill and technology by all of the relevant sciences that may be applicable to the art of healing. The health team recognizes every healthy, or apparently well person, each patient, the family, and the community as integral participants in the process of providing this overall care.

Autonomy and Competence

In contrast with our social attitude towards other occupations, society has accorded professions either explicitly or implicitly relatively complete autonomy in their work. It has been assumed that if their performance is unsatisfactory only another member of the profession can state whether this is the result of incompetence.

Medicine most completely fulfills Becker's[8] symbols of a profession. It is this inheritance which we find present in varying degrees in all of the organized health professions, and which inheritance reinforced by environmental factors leads to potential and actual conflicts among the health professional organizations, and also to conflicts with our rapidly changing public policy.

> It is important for administrators and supervisors to remember the high price they pay for inefficient conflict

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[8] Howard S. Becker, "The Nature of a Profession," Education for the Professions, (Chicago: National Society for the Study of Education, 1921).

> resolution, both from a personal as well as an organizational point of view. Although this is true in any organization it is particularly true in hospital administration, where service demands are intense and staff size is at times overwhelming.[9]

Conflicts among health professionals which have appeared sporadically in the past, will undoubtedly increase in frequency and intensity in the future. To prevent such potential conflicts from exploding and disrupting the proper delivery of health care, increased and more widespread cooperation among the health team professionals and educators of health professionals will be needed. Cooperation is more likely to result if there is, first of all, a mutual understanding of the functions and roles of other health professionals and secondly an adequate means of communication among them. Dolson observes,

> When asked to select six crucial problem areas in their hospital, doctors and administrators emphasized department head and departmental functioning, planning patient care services, working with medical staff, and business and financial management. The doctors also selected personnel management and employee relations, and community relations crucial.[10]

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[9]Larry L. Larrabee, Ph.D. and Robert E. Lefton, Ph.D., "Managing Intergroup Conflict within Your Organization," Hospital Progress, Vol. 49, No. 4, (April 1968), 62.

[10]Miriam T. Dolson, Ph.D., "M.D.--Administrators are Older, Earn More Money, Run Bigger Hospitals: Survey," Modern Hospital, Vol. 112, No. 2. (McGraw-Hill Publication, February, 1969), 96-98.

Purpose of This Study

The purpose of this study is to determine whether or not there is a difference in the perceptions held by nurses and medical technologists of the necessary characteristics of other health professionals for effective team functioning.

It is hypothesized that,

> Health professionals differ in perceptions of their own professional role, individually and collectively, as well as other health professionals with whom they work, individually and collectively.

In both sectarian and non-sectarian hospitals the team approach to medical care has developed rapidly within the last five to ten years. However, there has not been a concurrent change in the education of health personnel to accommodate the team concept.

Hypotheses to be Evaluated

The following hypotheses are established:

H_1: There are significant differences in the responses of nurses when compared with medical technologists on the Professional Perception Index.

H_2: There is a relationship between the age of the nurses and their perceptions of other health team workers.

H_3: There is a relationship between the age of the medical technologists and their perceptions of other health team workers.

H_4: There is a relationship between the number of years of experience of the nurses and their perceptions of other health team workers.

H_5: There is a relationship between the number of years of experience of medical technologists and their perceptions of other health team workers.

H_6: There is a relationship between the amount of education received by the nurses and their perceptions of other health team workers.

H_7: There is a relationship between the amount of education received by the medical technologists and their perceptions of other health team workers.

Definition of Terms

Health Team - A group of health personnel working in concert toward the goal of excellence in patient care.

Affective - Relating to arising from, or influencing feelings or emotions.

Cognitive - The act or process of knowing including awareness, judgment and action.

Nurse - Registered Nurse licensed to practice in the United States.

Physician - Medical Doctor licensed to practice in the United States.

Health Profession - Can be defined as one for which preparation is at the baccalaureate level.

Allied Health Occupation - The "allied" health occupations include a broad range--perhaps every group beyond medicine and dentistry.

Technologist - The word "technologist" is used to mean a person with baccalaureate level preparation and registered by the American Society of Medical Technologists.

Tavistock Model - Socio-technical system which is a combination of technology and a social system.

Technology - Task requirement, physical layout, equipment and supplies.

Social System - A system of relationship among those whom must perform the job.

Role Theory - Is defined as including theories of interpersonal perception, theories of organizational concept, theories of individual behavior, theories of legislatures, etc., may all involve the concept of role in their explanatory processes, and thus be considered "role theories."

Statistical significance .05 - The .05 level means that an obtained result that is significant at the .05 level could occur by chance only 5 times in 100 trials.

Statistical significance .01 - The .01 level means that an obtained result that is significant at the .01 level could occur by chance only once in 100 trials.

Theoretical Definitions of Variables

The following terms are used throughout this discussion of the study. In order to provide for clarity of meaning they are stated here in glossary fashion.

Independent Variables:

1. Experience - Number of years working as a professional nurse or medical technologist.
2. Education - The number of years spent in college, post high school. Education refers to the highest academic degree earned, diploma or certification.
3. Age - Refers to chronological years.

Dependent Variables:

1. Activity - Refers to movements, action, work, typing, writing, driving, etc. These are basically things people do to, or with nonhuman objects, or with other people when their reaction or reciprocal behavior is ignored (such as cutting a person's hair).
2. Interaction -Refers to feelings (happy, sad, angry, stern, loving); to attitudes (this is his job; it is time to go; he is conservative); or to beliefs. These constitute the inner state of the person, the things an individual subjectively perceives.
3. Sentiment - Refers to statements about interaction including going with someone, eating

together, working together, and the like. The basic characteristic of interaction is that it is behavior directed toward another person when his reaction or reciprocal behavior is taken into account.

CHAPTER II

REVIEW OF THE LITERATURE

Changes in Professional Achievements

Ours is indeed an age of startling and breathtaking changes. Surely, this change is reflected in the burgeoning demands for allied health workers precipitating the proliferation of more than 200 health occupations. The result of such proliferation is increased stratification within each health profession, as well as increased conflict among the various health professions.

The increased professionalization of health personnel such as nurses and medical technologists has resulted in an increase in professional independence leading to what Levy calls "Intra-Individual Conflict."[1] In the present age, no health professional is operating by himself in more or less of an endless vacuum. The physician is being asked to change from the private entrepreneur to the coordinator, collaborator and responsible agent for the total product of the team effort.

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[1]Samuel Levy, "The Hospital Reconsidered," Hospital Administration, Fall 1961, pp. 6-21.

Lambertsen submits that:

> Traditional roles of all practitioners in the health field are being challenged. If the hospital system is to meet the challenges, the physician in concert with administrators, nurses and other health service personnel must assume responsibility as one of the principal architects.
>
> Remedial measures that not only provide for but also demand physician participation in major policy decisions affecting the expansion or limitation of resources or services at any given time are imperative. But just as imperative is the recognition by physicians that many other health specialists, as well as community groups, are competent to--and expect to--participate in these decisions.
>
> The physician cannot continue to insulate himself from organizational stress and interpersonal conflict, but rather he must become increasingly aware that his concept of his role may well be a causative factor.[2]

Team Member Nervous Stress and Conflict

Laporte[3] studied the strains between scientists and administrators in industrial research organizations from a theoretical base similar to Etzioni's. From the literature he derived seven sources of possible conflict. However, using data from several previous studies, his analysis found only two sources to be conflictual, goal orientation and restrictiveness of measures of control and coordination. In interpreting his findings, Laporte argues that there existed

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[2]Eleanor C. Lambertsen, Ed.D., "Knowing Roles Aids Doctor-Nurse Accord," Modern Hospital, Vol. 112, No. 1 (McGraw Hill Publications, January 1969), 75-77.

[3]Todd R. Laporte, "Conditions of Strain and Accommodation in Industrial Research Organizations," Administrative Science Quarterly, Vol. 10 (June, 1965), p. 24.

three "elements of accommodation." They were separation of major functional roles within the organization between scientists, managers, and administrators, mechanisms neutralizing major external strains from corporations and government, and the similarity in background of the scientists, managers, and administrators.[4]

This similarity of backgrounds was not far from what Goss found to be operative among physicians in the outpatient clinic.[5] She examined the generalization, similar to that questioned by Hall, that professionals require a freedom to make decisions according to their own trained judgment. Her results indicated that no conflict arose primarily because all persons in the hierarchy were physicians, and conflict was avoided because the professional norms governing doctor-doctor relationships deemed such conflict unacceptable. What evolved in this situation instead of a formal authority hierarchy was a "formal advisory relationship."[6]

Other investigators have examined the nature of the professional's conflict with his employing organizations, although each orientation to the problem varies somewhat.

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[4] Ibid., p. 31.

[5] Mary E. Goss, "Influence and Authority Among Physicians in an Outpatient Clinic," American Sociological Review, Vol. 26, (February, 1961), 39-50.

[6] Ibid., p. 50.

Kornhauser, for example, defined the problem as being the basic organizational dilemma of autonomy vs. integration.[7] That is, scientists must be given enough autonomy to enable them to fulfill their professional needs, yet their activity must contribute to the overall goals of the organization.

Perucci studied social distance, bargaining power, and compliance with rules on a psychiatric hospital ward.[8] An organization, according to Perucci, is,

> . . . a network of social distance patterns built about a set of fixed positions, whose occupants behave in such a way as to enhance or maintain their status in the hierarchy.[9]

He hypothesized that

> the degree to which attendants on a hospital ward were rule-oriented was indirectly related to their access to public and private knowledge about doctors who were their super-ordinates.[10]

Role Theory

Levinson sums up the literature on the role theory in these words,

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[7]William Kornhauser, Scientists in Industry: Conflict and Accommodation, Berkeley: University of California Press (1962).

[8]Robert Peurcci, "Social Distance, Bargaining Power and Compliance with Rules on a Hospital Ward," Psychiatry, Vol. 29 (1) (1966), 42-55

[9]Ibid., p. 42.

[10]Ibid., p. 43.

> The concept of role remains one of the most overworked and underdeveloped in the social sciences.[11]

The purpose here is to first sort out the various meanings that have been ascribed to the term, "role," examine the concept of "role concensus," and present a sample of those studies related to the topic under investigation.

Levinson suggests that different writers, and at times the same writer, have used three definitions of the global term, role. It has been used to connote the structurally given demands of a given social position such as norms and responsibilities. In other instances it has been defined as the actions of individual members as seen in relation to prevailing norms. Or it has been defined as the member's orientation or conception of the part he is to play in the organization. And Linton put them all together and defined "role" to

> include the attitudes, values and behavior ascribed by the society to any and all persons occupying a status.[12]

In this latter sense society shapes the attitudes and beliefs of all the occupants of a given role.

An adjunct to the concept of "role," is "role and concensus." That is, there is a consensus among persons as to what is expected of an incumbent of a particular role.

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[11]Daniel J. Levison, Role, Personality and Social Structure in the Organizational Setting, Mimeographed paper, p. 1.

[12]Ralph Linton, The Cultural Background of Personality (New York: Appleton-Century 1945).

Gross[13] in his exhaustive analysis of the role of the school superintendent, however, found

> little or no consensus to exist among such persons as teachers, school board members and community businessmen regarding what constitutes the role of the superintendent.

This lack of role consensus is a characteristic of many in the health field. To assume that a role consensus exists for the hospital nurse or medical technologist, would imply that

> her role-requirements will be understood and agreed upon by the hospital administration, the nursing authorities, the physicians, etc.[14]

The fallaciousness of this assumption is borne out by Burling, Lentz, and Wilson's study of hospitals.[15] Using the techniques of participant observation and structured interviews over a period of two years, these researchers found, in part, confusion regarding nursing administration, differences in nurses' needs and expectations about supervision, and a breakdown of the status system, hierarchy and role expectations. The results of other studies of hospitals were similar.[16]

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[13]Neal Gross, W. S. Mason, and A. W. McEachern, Explorations in Role Analysis (New York: John Wiley, 1958).

[14]Levy, op. cit., p. 15.

[15]Temple Burling, Edith Lentz and Wilson, The Give and Take in Hospitals (New York: Putnam, 1956).

[16]Chris Argyris, Diagnosing Human Relations in Organizations: A Case Study of a Hospital (New Haven: Labor Management Center, Yale University, 1956).

The literature on hospitals, specifically, was found to be either anecdotal or of the participant observation type. As Seeman notes with regard to hospital studies,

> The bulk of work of the status system in medical organizations has been anecdotal in character or has avoided altogether the measurement of medically relevant consequences.[17]

Also of note is the absence of any methodology utilizing comparison groups across hospitals. Thus, it is evident that concepts such as role conflict and organizational conflict have been used in a variety of ways. Smith's definition of the term "organizational conflict" as being

> . . . a situation in which the conditions, practices or goals for the different participants are inherently incompatible[18]

is an example of broad statements that add to the confusion. Not any studies were found which used affective and cognitive variables to serve as the basis for operationalizing the problem of conflict and role confusion in the functioning of the health team.

It is believed that the findings of this study will be of help to all health team personnel who have problems similar to those investigated, and that in some way such

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[17]Melvin Seeman and J. W. Evans, "Stratification and Hospital Care: Part I," American Sociological Review, Vol. 26, 1961, 193-203.

[18]Clagett G. Smith,"A Comparative Analysis of Some Conditions and Consequences of Intra-Organizational Conflict," Administrative Science Quarterly, Vol. 10 (4) March, 1966 504-529.

problems will be resolved into cooperative operationality through innovations in the education of health professionals.

CHAPTER III

DESIGN OF THE STUDY

Types of Research

This study will combine the use of historical, descriptive, and analytical research methods. It has been stated that:

> 1. The purpose of this study is to determine whether or not there is a difference in the perceptions held by nurses and medical technologists of necessary characteristics for effective functioning;[1]

and,

> 2. It is hypothesized that health professionals differ in perceptions of their own professional role as well as in that of other health professionals with whom they work.[2]

Although there are multiple health professionals, the author elected to study carefully the nurse and the medical technologist as representatives of the whole. Therefore, in this study, nurses and medical technologists from two sectarian and two non-sectarian hospitals were asked to rate physicians, nurses and medical technologists on several cognitive and effective variables.

According to Cook[3] the nature and purpose of historical research in education is described as follows:

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[1] Supra., p. 6.

[2] Ibid.

[3] David R. Cook, A Guide to Educational Research (Boston: Allyn and Bacon, Inc., 1965), pp. 15-16.

> A knowledge of history has often been glibly defended as enabling us to avoid making the same mistakes in the future, or in some cases even to predict the future. There is a grain of truth in this, but it makes more sense to think of an understanding of history as providing us with a perspective on the future. Generally problems involving educational policy or processes can be studied by historical methods.

John W. Best gives the following definition of descriptive research:

> Descriptive research describes and interprets what is. It is concerned with conditions or relationships that exist; practices that prevail; beliefs, or points of view, or attitudes that are being felt; or trends that are developing. The process of descriptive research goes beyond mere gathering . . . of data. It involves an element of interpretation of the meaning or significance of what is described.[4]

Smith, Stanley and Shores[5] submit that analytical research is

> . . . content selection . . . of the things people do in order to discover the subject matter functioning in . . . various activities . . . There are three forms of analyses, as activity analysis, . . . job analysis, . . . and use of the processes of analysis to determine the elements of knowledge or the skills having general utility.

Nature of the Sample

The sample consisted of 75 nurses and 75 medical technologists from four hospitals, two sectarian and two non-sectarian in Illinois. Of the 150 copies distributed,

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[4]John W. Best, Research in Education, (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1959), pp. 102-3.

[5]Smith, Stanley and Shores, "The Nature of Analytical Procedure," Fundamentals of Curriculum Building (New York: World Book Co., 1950) pp. 306-312.

147 or 98 per cent were returned. However, 23 of those returned were considered invalid because they had left two or more blanks or two or more items of the Professional Perception Index were not answered. Therefore the sample consisted of 66 nurses and 58 medical technologists, or a total of 124 health professionals (82.6 per cent). Of these 29 nurses and 38 medical technologists are employed by sectarian hospitals. Those used in the study employed by non-sectarian hospitals numbered 38 nurses and 20 medical technologists.

NUMBER OF NURSES AND MEDICAL TECHNOLOGISTS IN THE SAMPLE

	Sectarian	Non-Sectarian
Registered Nurses	29	38
Medical Technologists	38	20

Both the nurses and the medical technologists were chosen at random by using a table of random numbers.[6]

SAMPLE POPULATION PROFILE

Medical Technologist

Age (years)	Experience (years)	Education (degree)	Sectarian
41 were 20-29	6 had -1	1 had A A	30 were
12 were 30-39	23 had 1-3	14 had ASCP	28 were
1 was 40-49	10 had 4-6	40 had BA or BS	not
4 were over 50	8 had 7-9	3 did not specify	
	11 had over 10		

[6]John E. Freund, Modern Elementary Statistics (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1967).

Registered Nurse

Age	Experience	Education	Sectarian
40 were 20-29	12 had -1	9 had A A	29 were
11 were 30-39	21 had 1-3	44 had ND	37 were not
10 were 40-49	4 had 4-6	12 had BA or BS	
5 were over 50	4 had 7-9	1 had MA or MS	
	23 had over 10		
	2 did not specify		

Instrumentation

The data instrument of this study was sent to 75 nurses and 75 medical technologists who served four Illinois hospitals. The study was conducted in two sectarian and two non-sectarian institutions. The instrument used is titled "Professional Perception Index," and was designed to measure the "Perceptions of the Members of the Health Team" as may be directly identified by nurses and medical technologists. The study consists of two parts. One is the development of an instrument for the measurement of role perceptions of nurses and medical technologists. The second part of the study is an analysis of the data obtained in using the instrument developed by the researcher.

After a study of Osgood's Semantic Differential, the personality attributes underlying Riesman's (1950) Inner-Directed-Other-Directed distinction, Whyte's (1956) description of the Protestant ethic versus the social ethic, and the self descriptions of top managers versus middle managers reported by Porter and Ghiselli (1957), the researcher

put together 150 items considered important for the proper functioning of a health team. Three pilot studies were performed utilizing 11 nurses and 7 medical technologists. After an item analysis of their responses, the researcher selected 27 items and combined these items into a composite with thirteen in the affective domain and fourteen in the cognitive domain.

In an attempt to conceptualize a model for team functioning, the work of the Tavistock Institute in London was studied. This institute made studies of changing technology in the coal mining industry and the redesign of work in Indian textile mills. From their studies they developed the concept of the socio-technical system which implied that any productive organization or part thereof is a combination of technology (task requirements, physical layout, equipment) and a social system (a system of relationship among those whom must perform the job). The technology and the social system are in mutual interaction with each other and each determines the other. With this concept in mind the twenty-seven variables compiled for this study have been divided into two parts--one relating to technology and the other to the social system as described by Trist of the Tavistock Institute. The model developed by the sociologist George Homans is not fundamentally at odds with the Tavistock model, but is somewhat more differentiated and complex. Homans postulates that activities,

interactions, and sentiments are mutually dependent on one another. (See Appendix G.)

Homans presents three aspects of a model: activities, interaction and sentiment. In Homans' theory there are three elementary concepts: the first, activities refers to movements, action, work, typing, writing, driving, etc. These are basically things people do to, or with nonhuman objects, or with other people when their reaction or reciprocal behavior is ignored (such as cutting a person's hair). Second, statements of sentiment refer to feelings (happy, sad, angry, stern, loving); to attitudes (this is his job; it is time to go; he is conservative); or to beliefs. These constitute the inner state of the person, the things an individual subjectively perceives. Thirdly, statements about interaction including going with someone, eating together, working together, and the like. The basic characteristic of interaction is that it is behavior directed toward another person when his reaction or reciprocal behavior is taken into account.[7]

Thus, any change in any of these three will produce some change in the other two. Therefore, the higher the rate of interaction of two or more people, the more positive will be their sentiments toward each other. In

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[7]George C. Homans, The Human Group (New York: Harcourt, 1950).

this study, interaction, in the mind of the author, is analogous to social system in the Tavistock studies; activity is analogous to technology and sentiment a function of both interaction and technology.

After consultation with various medical doctors, nurses, medical technologists the following items of the instrument were grouped under the heading of Activity, Sentiment and Interaction as proposed by Homans.

Item Numbers of Professional Perception Index

Sentiment	Activity	Interaction
1	2	5
7	3	8
12	4	10
16	6	11
21	9	14
22	13	15
24	20	17
25		18
		19
		23
		26
		27
Total 8	7	12

In addition, the participants were asked to rank various health professionals as to status and salary. The medical doctor was excluded on the salary question because those in the hospitals used for this study are independent entrepreneurs.

The sample consisted of seventy-five nurses and seventy-five medical technologists from four Illinois

hospitals--two sectarian institutions and two non-sectarian institutions. The instrument developed by the author is called the Professional Perception Index. Sectarian and non-sectarian hospitals were used because of the possibility that perceptions of professionals in sectarian institutions might be different due to the influence of religious beliefs.

Validity and Reliability

A group of experienced specialists made up of nine postgraduate nurses with at least five years of experience, seven medical technologists with at least three years of experience, two hospital administrators, two pathologists and one internal medicine doctor were consulted in the development of the instrument.

Reliability was computed on a Test-Retest measure from the data obtained from the administration of the instrument to nurses and medical technologists on two different occasions 20 days apart.

Table 1. Correlation Coefficients of Reliability of Test-Retest

	M.D.	M.T.	R.N.
Activity	0.6	0.6	0.8
Interaction	0.6	0.7	0.6
Sentiment	0.6	0.9	0.8
Total	0.6	0.7	0.8

The reliability coefficient is an estimate of the coefficient of correlation between the original set of scores versus the

independent scores gathered 20 days later. The correlations range between .6 and .9 with the average correlation for the entire test being .75. Thus, it is assumed that the reliability of the instrument is within acceptable limits.

Weight of Relevancy

In order to evaluate the relevance of each item of the instrument a self-administered questionnaire was given to 14 nurses and 12 medical technologists. (See Appendix B.)

Table 2. Relevancy of Items Contained in the Professional Perception Index

Measure of Relevancy	Number of Responses	Per Cent of The Total Responses
Very important	447	63.67
Moderately important	201	28.63
Slightly important	38	5.41
Irrelevant	3	0.43

If the very important and the moderately important are grouped together, 92.3 per cent of the items of the Professional Perception Index were considered relevant by members of the two health professions studied. This is an indirect measure of the validity of the Professional Perception Index.

Statistical Analysis

Statistical methods used were "t" Test of Significance Between Two Sample Means using Fisher's distribution. In addition the Pearson product moment correlation coefficient was used to measure linear regression and correlation. (Appendix E.)

The Pearson Product Moment Correlation Coefficient was used in the analysis. The choice of this statistical procedure may be justified on the basis of the random sampling procedure used and the size of the sample. With a sample size of 150 randomly chosen we can assume a fairly normal distribution of index scores. In addition, the scores are independently determined.

For a continuous, quantitive range of index scores, the correlation coefficient is a more sensitive and powerful test of relationship than a Chi-Square test or other non-parametric statistical test.

Also, the researcher examined hypotheses two through seven by means of application of the t Test of Significance. The t Test of Fisher has been chosen in preference to the Z because of the sample size and the independence of the items used.

Limitations of the Study

Since this research was done primarily in the Chicago Metropolitan area, one cannot extrapolate to other

geographic areas. Furthermore, the 27 variables subsumed under the three categories of Homans' model, activities, sentiment and interaction may not have been accurately grouped. Although there was relatively good agreement on the category to which each variable should be placed, there was some disagreement on the part of nurses and medical technologists especially in the categories of sentiment and interaction.

CHAPTER IV

ANALYSIS OF RESULTS

Differences in Perceptions of Nurses and Medical Technologists

The sample consisted of 124 subjects of which 66 were registered nurses and 58 were medical technologists. The instrument used was the Professional Perception Index developed by the author. The instrument, the Professional Perception Index, is a self-administered questionnaire consisting of two parts. Part A deals with demographical information and Part B is composed of 27 items considered part of effective health team functioning. (Appendix B.) The subjects were asked to rank on a 1 to 5 scale medical doctors, nurses and medical technologists on each variable.

Each of the items in the Professional Perception Index is independent. Therefore, each subject responded freely to each item and had a range of five possible responses from which he could choose one.

The difference in the scores given by nurses and medical technologists are given in Table 3 using t scores and per cent probability that the difference in scores was due to chance.

Table 3. Difference between Medical Technologists and Registered Nurses in rating Medical Doctors, Medical Technologists and Registered Nurses Using the Professional Perception Index

Total or Sub-Total	M.D.		M.T.		R.N.	
	t	%p	t	%p	t	%p
Activity	-1.234	30	0.996	40	-5.654	1
Interaction	-2.467	2	0.925	40	-6.504	1
Sentiment	-1.914	10	1.077	30	-5.890	1
Total	-2.204	5	1.099	30	-6.617	1

The above data indicates that the differences in the perceptions of nurses and medical technologists are statistically significant in all aspects of the professional perception index dealing with nurses. A 1 per cent probability that the difference is due to chance means that the difference is statistically significant at the .01 level or 99 per cent level of confidence. Therefore, we can infer that nurses perceive themselves very differently from the way medical technologists perceive them.

When rating medical doctors, nurses and medical technologists differed significantly in the total scores as well as in those items grouped in the category, interaction. Since nurses because of their function are more frequently involved with medical doctors than are medical technologists, the differences in their perceptions are not surprising. A 2 per cent probability that the difference is due to chance means that the difference is statistically significant

at the .02 level or 98 per cent confidence level. There are differences in the perceptions of medical doctors by nurses and medical technologists in those items grouped under sentiment. However, the difference is not statistically significant because this difference could occur by chance 10 times out of 100 or 90 per cent level of confidence. However, this difference of .10 level cannot be disregarded, even though it is less than the commonly accepted .05 level. In Homans' category, Activity, there was far less difference in the scores which medical technologists and nurses gave to medical doctors. Thus, we can infer that nurses and medical technologists are more congruent in their perceptions of the activities of medical doctors than in their perceptions of those items of the Professional Perception Index grouped under interaction or sentiment as applied to medical doctors.

Although nurses and medical technologists rate medical technologists differently, this difference is not statistically significant. Therefore, we can infer that nurses and medical technologists perceive the activities, interaction and sentiment of medical technologists more similarly than they perceive the same attributes of nurses or medical doctors.

Sectarian vs. Non-Sectarian

The differences in the scores given by nurses and medical technologists in sectarian and non-sectarian hospitals are given in Table 4 using t scores and per cent probability that the difference in scores was due to chance.

Table 4. Differences in Perceptions Given by Medical Technologists and Nurses in Sectarian and Non-Sectarian Hospitals

Total or Sub-Total	M.D.		M.T.		R.N.	
	t	%p	t	%p	t	%p
Activity	-0.882	40	-1.1876	30	-0.0924	100
Interaction	-0.5851	60	-0.7619	50	-0.9345	40
Sentiment	-0.2105	90	-0.0080	100	0.0706	100
Total	-0.6523	60	-0.7467	50	-0.4809	70

In this table %p refers to the probability that the differences in the scores were due to chance. Thus we can infer that the perceptions of nurses and medical technologists working in sectarian and non-sectarian hospitals are not significantly different. Thus, on the basis of this data, we can say:

$$\begin{pmatrix}\text{Sectarian}\\ \text{Nurse}\\ \text{Views}\end{pmatrix} + \begin{pmatrix}\text{Sectarian}\\ \text{Med Tech}\\ \text{Views}\end{pmatrix} = \begin{pmatrix}\text{Non-Sect}\\ \text{Nurse}\\ \text{Views}\end{pmatrix} + \begin{pmatrix}\text{Non-Sect}\\ \text{Med Tech}\\ \text{Views}\end{pmatrix}$$

this doesn't necessarily mean that

$$\begin{pmatrix}\text{Sectarian}\\ \text{Nurse}\\ \text{Views}\end{pmatrix} = \begin{pmatrix}\text{Non-Sect}\\ \text{Nurse}\\ \text{Views}\end{pmatrix} \text{ and } \begin{pmatrix}\text{Sectarian}\\ \text{Med Tech}\\ \text{Views}\end{pmatrix} = \begin{pmatrix}\text{Non-Sect}\\ \text{Med Tech}\\ \text{Views}\end{pmatrix}$$

Perceptions vs. Education

The education of medical technologists does not appear to influence significantly their perceptions of medical doctors and medical technologists.

Table 5. Analysis of Variance of the Education of Medical Technologists and their Perceptions of Medical Doctors

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	748.08252	748.08252	2.88030
Deviation from Regression	53	13765.35547	259.72363	
Total	54	14513.43750		

An F value of 2.880 or 90 per cent level of confidence means that there is a difference but this difference is not significant at the .05 level.

Table 6. Analysis of Variance of the Education of Medical Technologists and their Perceptions of other Medical Technologists

Source Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	511.29883	511.29883	2.56755
Deviation from Regression	53	10554.36719	199.13899	
Total	54	11065.66406		

An F value of 2.567 or less than 90 per cent level of confidence means that the differences in years of formal schooling of medical technologists do not significantly effect their perceptions of medical technologists.

However, the education of medical technologists does appear to influence their perceptions of nurses in all three of the components, activities, interaction and sentiment.

Table 7. Analysis of Variance of Years of Formal Schooling of Medical Technologists and Their Perception of the Activities of Nurses

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	123.23311	123.23311	5.19818
Deviation from Regression	53	1256.46997	23.70697	
Total	54	1379.70288		

An F value of 5.198 indicates that the difference in the years of formal schooling of medical technologists relative to their perceptions of the activities of nurses is statistically significant to the .05 level. This means that only 5 per cent of the difference can be attributed to chance, therefore, the level of confidence is 95 per cent. When analyzing the dependent variable, interaction, the effects of education of medical technologists on their perceptions of the interaction of nurses the differences were even greater than those of the dependent variable, activity.

Table 8. Analysis of Variance of Years of Formal Schooling of Medical Technologists and Their Perception of the Interaction of Nurses.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	463.85693	463.85693	7.66405
Deviation from Regression	53	3207.75757	60.52373	
Total	54	3671.61450		

An F value of 7.664 indicates that the difference in the education of medical technologists relative to their perceptions of the interaction of nurses is statistically significant to the .01 level. This means that only 1 per cent of the difference can be attributed to chance. Therefore, the level of confidence is 99 per cent.

The education of medical technologists did not appear to influence to the .05 level of significance their perceptions of nurses on those items grouped under sentiment. The F value for this analysis of variance was 3.47636, which would indicate a confidence level of 90 per cent. When the total number of items of the Professional Perception Index was analyzed, to determine the effects of formal schooling on the perceptions of medical technologists toward nurses, it appears that formal schooling may have an effect on the perceptions of medical technologists when ranking nurses. Therefore, we cannot reject the hypothesis that years of formal schooling influence the perceptions of medical technologists as reflected by the Professional Perception Index.

Table 9. Analysis of Variance of Years of Formal Schooling of Medical Technologists and the Perceptions of Nurses on Total Scores

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	1740.51050	1740.51050	7.38732
Deviation from Regression	53	12487.21094	235.60774	
Total	54	14227.71875		

An F value of 7.387 or confidence level of 99 per cent means that the differences in the years of formal schooling of medical technologists suggest that years of formal schooling may effect their perception of nurses. The more years of formal schooling the medical technologist has, the more favorably she perceives the nurse. The years of formal schooling of nurses does not appear to influence their perceptions of medical technologists, medical doctors or nurses.

Table 10. Computed F Values of the Years of Formal Schooling of Nurses and Their Perceptions of Medical Doctors, Medical Technologists and Registered Nurses

Total or Sub-Total	M.D.	M.T.	R.N.
Activity	0.26806	0.01107	1.19774
Interaction	0.07965	0.12802	0.03341
Sentiment	0.24723	0.44607	0.10807
Total	0.02351	0.18128	0.00926

None of these computed values are significant, therefore, it cannot be said that the perceptions of nurses are effected by years of formal education post high-school.

Perceptions vs. Experience

When comparing the years of work experience as a medical technologist with their perceptions of medical doctors, nurses and medical technologists, it appears on the basis of the following data that differences in experience do effect the perceptions of medical technologists.

Table 11. Computed F Values of the Experience of Medical Technologists and Their Perceptions of Medical Doctors, Medical Technologists, and Registered Nurses

Total or Sub-Total	M.D.	M.T.	R.N.
Activity	1.5568	3.6703	0.0068
Interaction	2.2395	5.3772	0.7664
Sentiment	1.3627	1.1487	0.0003
Total	2.3158	4.4561	0.1784

With 1 and 56 degrees of freedom an F value statistically significant at the .05 level must be over 4.000. An F value of 5.377 is statistically significant at the .05 level or 95 per cent level of confidence.

Experience of Medical Technologists as compared with their perceptions of Interaction of Medical Technologists.

An analysis of the F values and the sign of the regression coefficient indicates that the more experienced medical technologists rated the medical technologist more poorly than did the inexperienced medical technologist especially in the category of interaction. A possible explanation may be that the more experienced medical technologists become more demanding as they get older.

Although not statistically significant, the differences in experience of medical technologists appear to effect their perceptions of medical doctors. However, on the basis of this data experience of medical technologists has very little affect on their perceptions of nurses.

Differences in the experience of nurses did not appear on the basis of the following data to significantly effect their perceptions of medical doctors, medical technologists and nurses.

Table 12. Computed F Values of the Differences in Experience of Nurses and Their Perceptions of Medical Doctors, Medical Technologists, and Registered Nurses

Total or Sub-Total	M.D.	M.T.	R.N.
Activity	0.8028	0.9612	0.2899
Interaction	0.2161	2.6622	0.0082
Sentiment	0.0116	1.7853	0.0812
Total	0.2655	2.3262	0.0093

With one and 62 degrees of freedom the F value to be statistically significant at the .05 level would have to be 4.00 or more. In the above data it appears that experience of nurses may effect their perceptions of medical technologists especially in the category of Interaction. An F value of 2.6522 means that the level of confidence is less than 90 per cent. Although this value is not statistically significant at the .05 level, the regression coefficient does suggest that the more experienced nurses ranked medical technologists lower than did the inexperienced nurses.

Age vs. Perceptions

When comparing the age of medical technologists with their perceptions of medical doctors, nurses and medical

technologists, it appears on the basis of the following data that age does not significantly alter the perceptions of medical technologists.

Table 13. Computed F Values of the Age of Medical Technologists and their Perceptions of Medical Doctors, Medical Technologists, and Registered Nurses

Total or Sub-Total	M.D.	M.T.	R.N.
Activity	0.0372	2.3996	0.1384
Interaction	0.0656	1.9776	0.7910
Sentiment	0.0979	0.6197	0.7210
Total	0.0250	2.0786	0.6875

An F value of 2.399 means that the differences in perceptions could occur by chance at least one time out of 10 or less than 90 per cent level of confidence. Therefore we cannot reject the hypothesis that the regression line does not do a significantly (to the .01 or .05 levels) better job of representing the data than a horizontal line whose height is the mean. In other words, we cannot be 90 per cent confident if we say that "There is a variation of medical technologists perceptions with age" on the basis of our data.

When comparing the age of nurses with their perceptions of medical doctors, medical technologists, and registered nurses, it appears on the basis of the following data that differences in age may significantly alter the perceptions of nurses.

Table 14. Computed F Values of the Differences of Age of Nurses and Their Perceptions of Medical Doctors, Medical Technologists, and Registered Nurses

Total or Sub-Total	M.D.	M.T.	R.N.
Activity	0.6838	2.7560	0.3326
Interaction	0.3365	5.2518	0.1498
Sentiment	0.7653	4.0241	0.1555
Total	0.1115	5.1502	0.2064

With 1 and 64 degrees of freedom, an F value of 4.00 is statistically significant at the .05 level. Therefore, the data indicate that the age of nurses may influence their perceptions of medical technologists especially in Homans' categories of Interaction and Sentiment as measured by the Professional Perception Index.

Table 15. Analysis of Variance Age of Nurses and Their Perceptions of Medical Technologists

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	1497.74072	1497.74072	5.15020
Deviation from Regression	64	18611.99609	290.81226	
Total	65	20109.73437		

An F value of 5.1502 is statistically significant at the .05 level. Therefore, these differences are statistically significant at the .05 level or 95 per cent level of confidence. Thus, older nurses rated medical technologists better than did younger ones. This may be due to the rapid

technological advancements made in laboratory medicine in the past 10 years. If one were to assume that the older nurses were in supervisory positions, they would be more familiar with the technical advancements because they would be requesting laboratory procedures as directed by the physician. However, the age of nurses does not appear to significantly alter their perceptions of medical doctors or nurses on the basis of this data.

Status and Salary

In addition, the participants were asked to rank various health professionals as to status and salary. The medical doctor was excluded on the salary question because those in the hospitals used for this study are independent entrepreneurs.

It is interesting to note that 64 per cent of the total sample population rated the administrator first in status and 46 per cent rated the physician first in status. This may be explained by the fact that a dual hierarchy exists in most hospitals whereby, the administrator is responsible for supplying personnel while the physician diagnoses and prescribes for patients. Therefore, both nurses and medical technologists take directions from both the administrator and physician. However, administrators pay the salaries of both nurses and medical technologists employed by the hospital. The following table reflects the data on status:

Table 16. Per Cent of Total Sample Medical Technologists and Nurses Ranking Other Health Professionals on Status

	One	Two	Three	Four	Five	Six	Seven
X-Ray Technologist	0	1	1	5	17	36	21
Physician	32	57	1	2	0	0	1
Medical Technologist	0	1	11	17	25	17	17
Administrator	64	25	1	0	0	0	1
Practical Nurse	0	2	2	10	10	10	13
Nurse	4	1	37	24	17	8	1
Dietician	0	0	7	10	18	16	26
Pharmacist	0	6	42	26	10	6	2

As to salary, 90 per cent rated the administrator first and 74 per cent ranked the pharmacist second. The dietician was ranked below both the medical technologist and the nurse by 61 per cent. See Table 17 for salary rankings of both nurses and medical technologists:

Table 17. Per Cent of Sample Medical Technologists and Nurses Ranking Health Professionals on Salary

	One	Two	Three	Four	Five	Six	Seven
Nurse	0	4	26	37	16	8	0
Administrator	90	0	0	0	0	0	3
Pharmacist	0	74	8	4	1	2	1
Practical Nurse	0	0	1	4	9	18	58
X-Ray Technologist	0	0	5	10	28	37	10
Medical Technologist	0	6	21	19	23	11	8
Dietician	0	2	29	17	18	19	5

Employing a simple ranking procedure it was discovered that although both medical technologists and nurses agreed on many positions within the Salary and Status Scales for other health professions, they each saw the other ranked below themselves. Thus, nurses ranked themselves fourth on the Status Scale and technologists sixth. They also ranked themselves third on the Salary Scale while placing the technologists fifth. Conversely, the medical technologists placed themselves third on the Status Scale and ranked nurses immediately below them in the fourth position. Continuing in this pattern they ranked themselves third on the Salary Scale and the nurses immediately below them in the fourth position.

Table 18. Status and Salary Scale

Registered Nurse Rankings

Status Scale	Salary Scale
Administrator	Administrator
Physician	Pharmacist
Pharmacist	Nurse
Nurse	Dietician
Dietician	Medical Technologist
Medical Technologist	X-ray Technician
X-ray Technician	Practical Nurse
Practical Nurse	

Medical Technologist Rankings

Status Scale	Salary Scale
Administrator	Administrator
Physician	Pharmacist
Medical Technologist	Medical Technologist
Nurse	Nurse
Dietician	Dietician
X-ray Technician	X-ray Technician
Practical Nurse	Practical Nurse

Summary

In summary, nurses and medical technologists have different perceptions of the activities, interaction and sentiment of medical doctors, medical technologists and nurses as indicated by the Professional Perception Index. The greatest differences in the perceptions of nurses and medical technologists occur in the rankings of nurses and medical doctors. The difference in the ranking of nurses by nurses and medical technologists is statistically significant at the .01 level or 99 per cent level of confidence. The difference in the ranking of medical doctors by nurses and medical technologists is statistically significant at the .05 level or 95 per cent level of confidence. Although not statistically significant, the rankings of medical technologists by nurses and medical technologists cannot be ignored since this 70 per cent level of confidence may indicate a difference.

On the basis of this data, the more years of formal schooling a medical technologist has, the higher she ranked nurses especially in the categories of activities (.05 level) and interaction (.01 level). Years of formal schooling appeared to have no significant effect on the perceptions of nurses.

The experience of medical technologists has an influence on their perceptions of nurses especially in

the categories of nurses' activities and interaction on the basis of this data (significant to the .05 level). The experience of nurses did not appear to significantly alter their perceptions of medical doctors, nurses or medical technologists.

The differences in age of medical technologists did not appear to significantly alter their perceptions of medical doctors, medical technologists and nurses according to the Professional Perception Index. Although differences in the age of nurses did not appear to alter their perceptions of medical doctors or nurses, age differences of nurses did appear to significantly alter their perceptions of medical technologists. These differences were statistically significant to the .05 level or 95 per cent level of confidence.

CHAPTER V

SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

Summary

In summary, nurses and medical technologists have different perceptions of the activities, interaction and sentiment of medical doctors, medical technologists and nurses as indicated by the Professional Perception Index. The greatest differences in the perceptions of nurses and medical technologists occur in the ratings of nurses and medical doctors. The difference in the rating of nurses by nurses and medical technologists is statistically significant at the .01 level or 99 per cent level of confidence. The difference in the rating of medical doctors by nurses and medical technologists is statistically significant at the .05 level or 95 per cent level of confidence. Although not statistically significant, the ratings of medical technologists by nurses and medical technologists cannot be ignored since this 70 per cent level of confidence does indicate a difference.

On the basis of this data, the more education a medical technologist had, the higher she rated nurses especially in the categories of activities (.05 level)

and interaction (.01 level). Years of formal schooling did not appear to alter the perceptions of nurses.

The experience of medical technologists does appear to influence their perceptions of nurses especially in the categories of nurses' activities and interaction on the basis of this data (significant to the .05 level). The experience of nurses did not appear to significantly alter their perceptions of medical doctors, nurses or medical technologists.

The differences in age of medical technologists did not appear to significantly alter their perceptions of medical doctors, medical technologists and nurses according to the Professional Perception Index. Although differences in the ages of nurses did not alter their perceptions of medical doctors or nurses, age differences of nurses did appear to significantly alter their perceptions of medical technologists. These differences were statistically significant to the .05 level or 95 per cent level of confidence.

Implications

The advent of comprehensive care and extended care has contributed to the changing role of health professionals. The team approach implies cooperation, collaboration, open communications, elimination of power struggles and commitment to the concept of optimum health care for all. Respect and

positive interpersonal relations will be enhanced by an understanding of the contributions of each of the health professionals.

Since there are significant differences in the way nurses perceive themselves and the way medical technologists perceive nurses, one can infer, on the basis of this data, that these differing perceptions may contribute to the daily observable conflict on the health team. Because the patient is housed in a unit administered by nurses, the therapeutic, diagnostic and institutional services are usually initiated, coordinated and facilitated by a nurse. In view of the statistically significant differences in the perceptions of nurses by medical technologists, the data in this research would suggest both pre-professional and professional education of medical technologists relative to the role of the nurse. However, this education should begin with emphasis on the commonalities found in the functioning of all health professionals, namely, the best possible patient care.

Due to the technological advancements and the resulting radical changes in health care, all health professionals must be educated for change and adaptation. Furthermore, the health professional organizations in consort with hospital administrators need to define the role of each health professional. The patterns of organization and processes of

interaction among the various professionals must be re-assessed. The degree of planned interaction among health professionals is directly related to the quality of patient care. "The many misunderstandings that can occur during each day have a high probability of reducing the opportunities for expert care. Time that probably would be devoted to the care of patients must be used to untangle misunderstandings and salve hurt feelings."[1]

Because the role of the various health professionals is in a state of transition, differences in the perceptions of these roles must be clarified. In addition to role definition, there must be a definition of the functions and scope of each department in the hospital. In addition to "intra-personal" conflict on the health team, inadequate role definition and role consensus contributes to institutional role conflict. When nurses or medical technologists are expected to assume responsibility for a managerial role, the inevitable result is conflict between the organizational goals and professional orientation.

Clarification of roles and territorial imperatives might be delineated by the use of inter-professional committees in universities and hospitals. Such committees would give to each health professional the opportunity to

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[1]Luther P. Christman, R.N., Ph.D., "Nurse-Physician Communications in the Hospital," JAMA, 194 (November 1, 1965) 539.

voice his opinions, problems and concerns in an atmosphere of open forum. In universities, inter-professional leadership groups could provide direction for curriculum programming with emphasis on the team concept in health care. In-service education in the hospital could take the form of an open forum where each health professional would be oriented to the role of other health professionals.

At the present time, the role of the nurse is fragmentized into many parts. Because she is coordinator of patient services, she must fill in when the specialty person, such as the dietician or medical technologist, does not appear on duty, i.e. in the absence of the dietician, the nurse must pass trays; in the absence of the medical technologist, the nurse must contact a physician or resident physician to draw blood for therapeutic or diagnostic procedures.

In this study, nurses perceived the role of medical technologists much more congruently than did medical technologists perceive the role of nurses. This data suggests that medical technologists are not aware of the multiple interactions of nurses with other health professionals nor of the limited interactions of medical technologists with other health professionals.

Thus, interdisciplinary education in the pre-professional and professional development of health

personnel would help to clarify the roles of health professionals in the present transition as well as in future planning.

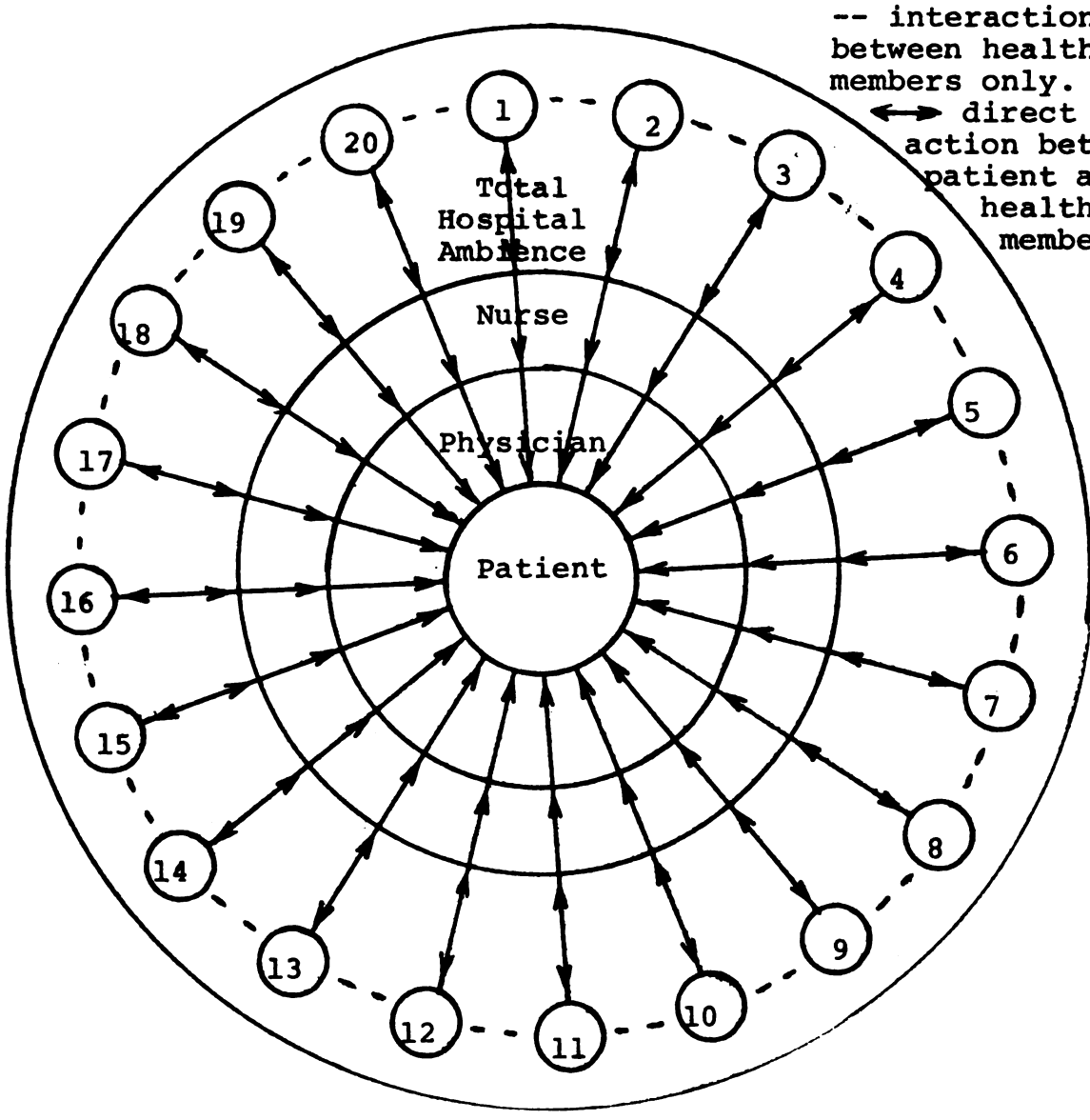
As to pre-professional education, the sharing of courses and aspirations, as well as formal and informal conferences on the roles of various health professionals may help to preserve the altruistic nature of health professional students at the time of their entrance to the program. Since attitudes are shaped in the pre-professional days, it is essential that the high degree of commitment in applicants be preserved and enhanced. For a better understanding of the role of the nurse, education programs for other health professionals might well include clinical time in nursing to observe the total patient care day and to become cognizant of the fact that an ordinary patient may see 30-40 persons in the course of a single day in the hospital. Conversely, nursing education would benefit from some clinical time at least in the major ancillary departments, i.e., clinical laboratory and radiology.

The suggested program content mentioned above could be used for in-service education in hospitals and other health care facilities. In addition, both pre-professional and in-service education should provide background in depth in the field of human relations by providing behavioral science courses and/or workshops dealing directly with patient care.

In an effort to convey an understanding of the total patient care environment found within a hospital setting, the author has attempted to devise a model. The model depicts in a schematic drawing the various complicated interplays between members of the health team.

In this model, the patient is central and of prime importance. The physician is the closest to the patient since it is because of the physician that the patient is in the hospital. The physician writes the medical orders. These orders then pass through the filter of the nurse who translates these orders and activates the allied health personnel in the appropriate department for implementation. In addition, the specific health professional must collaborate with the nurse for the efficient performance of the physician's orders. Thus, the nurse is responsible for filtering the doctor's orders. She also initiates orders i.e., oxygen therapy, housekeeping and emergency laboratory procedures.

Two-way communication must exist in all facets represented. This graphic representation of total hospital ambience is presented as a partial solution to the misconceptions of roles of the various health professionals.



1. Pharmacy
2. Occupational Therapy
3. Physical Therapy
4. Radiology
5. Clinical Laboratory
6. Chaplain Service
7. Housekeeping
8. Accounting Department
9. Social Service
10. Maintenance Department
11. Cardiology
12. Electro-encephalography
13. Pulmonary Function
14. Clinic Services
15. Public Relations
16. Dentistry
17. Dietetics-nutrition
18. Neuro-mental
19. Volunteer Service
20. Nursing Education

Recommendations for Future Research

Since this research was done primarily in the Chicago Metropolitan area the data are limited to that geographic area and may not apply to all parts of America.

Research such as this answers some questions but leaves others unanswered and creates still further topics for future research. Some problems yet to be explored suggest the following possibilities:

1. Replicate this study in another geographic area.
2. Replicate this study in health facilities other than hospitals (i.e., Nursing Homes, Clinics).
3. Develop a similar study using as subjects other health professionals such as radiologic technologists and dieticians.
4. A similar study involving only students in the health professions in their last year of education.

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APPENDICES

APPENDIX A

DEFINITIONS OF TERMS

Theoretical Definitions of Variables

The following terms are used throughout this discussion of the study. In order to provide for clarity of meaning they are stated here in glossary fashion.

Independent Variables:

1. Experience - Number of years working as a professional nurse or medical technologist.
2. Education - The number of years spent in college, post high school. Education refers to the highest academic degree earned, diploma or certification.
3. Age - Refers to chronological years.

Dependent Variables:

1. Activity - Refers to movements, action, work, typing, writing, driving, etc. These are basically things people do to, or with nonhuman objects, or with other people when their reaction or reciprocal behavior is ignored (such as cutting a person's hair).
2. Interaction- Refers to feelings (happy, sad, angry, stern, loving); to attitudes (this is his job; it is time to go; he is conservative); or to beliefs. These

constitute the inner state of the person, the things an individual subjectively perceives.

3. Sentiment - Refers to statements about interaction including going with someone, eating together, working together, and the like. The basic characteristic of interaction is that it is behavior directed toward another person when his reaction or reciprocal behavior is taken into account.

Definitions

Health Team - A group of health personnel working in concert toward the goal of excellence in patient care.

Affective - Relating to arising from, or influencing feelings or emotions.

Cognitive - The act or process of knowing including awareness, judgment and action.

Nurse - Registered Nurse licensed to practice in the United States.

Physician - Medical Doctor licensed to practice in the United States.

Health Profession - Can be defined as one for which preparation is at the baccalaureate level.

Allied Health Occupation - The "allied" health occupations include a broad range--perhaps every group beyond medicine and dentistry.

Technologist - The word "technologist" is used to mean a person with baccalaureate level preparation and registered by the American Society of Medical Technologists.

Tavistock Model - Socio-technical system which is a combination of technology and a social system.

Technology - Task requirement, physical layout, equipment and supplies.

Social System - A system of relationship among those whom must perform the job.

Role Theory - Is defined as including theories of interpersonal perception, theories of organizational concept, theories of individual behavior, theories of legislatures, etc., may all involve the concept of role in their explanatory processes, and thus be considered "role theories."

APPENDIX B

THE INSTRUMENT OF THIS STUDY

PERCEPTIONS OF THE MEMBERS OF THE HEALTH TEAM

August 19, 1969

Dear Participant,

This questionnaire is part of a study of public and non-public hospitals. The objectives of the study are to gain a better understanding of some of the factors that influence both registered nurses and medical technologists.

Please respond to the following questions as they relate to your perceptions of the average health professional.

Your responses will remain entirely anonymous. We are concerned only with answers from groups of people, not with any single individual's response. The numbers on the questionnaire serve only to keep the sections together, not to identify persons. Thank you for your cooperation.

Sincerely,

Sister M. Rosarii Saunders
Michigan State University

PERCEPTIONS OF THE MEMBERS OF THE HEALTH TEAM

Part A

1. Size of Hospital

   1. _____ 100 to 200 beds
   2. _____ 200 to 400 beds
   3. _____ Over 400 beds

2. Nature of Hospital

   1. _____ Public
   2. _____ Non-public

3. Profession

   1. _____ Nurse
   2. _____ Medical Laboratory Technologist

4. Offices held in your professional organization (local, county)

   1. _____ None (local, county)
   2. _____ One to three (local, county)
   3. _____ More than three (local, county)

5. Offices held in your professional organization (state, regional)

   1. _____ None (state, regional)
   2. _____ One to three (state, regional)
   3. _____ More than three (state, regional)

6. Offices held in your professional organization (Nat'l., or Int'l.)

   1. _____ None (Nat'l., Int'l.)
   2. _____ One to three (Nat'l., Int'l.)
   3. _____ More than three (Nat'l., Int'l.)

7. What is your marital status

   1. _____ Single
   2. _____ Married
   3. _____ Widowed
   4. _____ Divorced

8. Please check your age range scale

1. _____ 20-29
2. _____ 30-39
3. _____ 40-49
4. _____ Over 50

9. Your sex

1. _____ Male
2. _____ Female

10. Predominant shift worked for the past 2 years

1. _____ Days
2. _____ Evenings
3. _____ Nights

11. How many years of experience as either a nurse or medical technologist do you have

1. _____ Less than one
2. _____ 1-3
3. _____ 4-6
4. _____ 7-9
5. _____ Over 10

12. Please indicate your highest academic achievement. Check only one.

1. _____ BA or BS
2. _____ MA or MS or MEd
3. _____ Associate of Arts (Community College)
4. _____ Nursing Diploma
5. _____ Registration by American Society of Clinical Pathologists
6. _____ Ph.D. - Ed.D.
7. _____ Other _____(Please Specify)

13. Your present position (check only one)

1. _____ Staff Nurse
2. _____ Head Nurse
3. _____ Nurse Supervisor
4. _____ Staff Medical Technologist
5. _____ Laboratory Supervisor (Two or more units i.e., Chemistry and Hematology).
6. _____ Unit or Department Chief Technologist (i.e., Chemistry or Hematology, etc.)

7. _____ Clinical Instructor in Nursing
8. _____ Clinical Instructor in Medical Technology
9. _____ Other _____ (Please specify)

Part B

Following is a list of items which are considered part of effective health team functioning. Using the Medical Laboratory Technologist, Registered Nurse and Medical Doctor as professionals on this team, rank (1 = highest; 5 = lowest) the members as you perceive their average performance for each variable. These three team members are listed in alphabetical order for your convenience. (You may use the same rank number twice as per example #2 below.)

Example: (These are not considered part of the health team.)

	(M.D.)	(M.T.)	(R.N.)	
1.	1	2	3	(Ex.) Drives conservative car
2.	5	2	2	(Ex.) Is afraid of cars

(M.D.)	(M.T.)	(R.N.)		
_____	_____	_____	1.	persuasive
_____	_____	_____	2.	adheres to hospital policies
_____	_____	_____	3.	is organized in work
_____	_____	_____	4.	is accurate in observations
_____	_____	_____	5.	accepts suggestions well
_____	_____	_____	6.	is aware of patients' physical needs
_____	_____	_____	7.	is discreet in use of confidential information
_____	_____	_____	8.	actively contributes to formulation of team policy
_____	_____	_____	9.	accurate in carrying out procedures
_____	_____	_____	10.	possesses respect for contribution of other team members

(M.D.)	(M.T.)	(R.N.)		
_____	_____	_____	11.	has good patient relationship
_____	_____	_____	12.	is tolerant of errors of other team members
_____	_____	_____	13.	adheres to aseptic techniques
_____	_____	_____	14.	has a good relationship with subordinates
_____	_____	_____	15.	is willing to communicate downward
_____	_____	_____	16.	is aware of patients' emotional needs
_____	_____	_____	17.	seeks contributions of other team members
_____	_____	_____	18.	is willing to communicate upward
_____	_____	_____	19.	delegates responsibility
_____	_____	_____	20.	influences hospital policy
_____	_____	_____	21.	adapts easily to change in procedures
_____	_____	_____	22.	is willing to compromise when alternative measures are to be presented
_____	_____	_____	23.	has a good relationship with other health team professionals (i.e., physician to medical technologist; medical technologist to nurse; etc.)
_____	_____	_____	24.	has empathetic concern for the patient
_____	_____	_____	25.	readily admits errors and omissions
_____	_____	_____	26.	has good relationship with peer members (i.e., physician to physician; nurse to nurse; etc.)
_____	_____	_____	27.	uses terminology understandable to specific team members

* * * * * *

On a typical day, how much time do you spend communicating with the following?

		0 min.	5 min.	15 min.	30 min.	or more
28.	a nurse	_____	_____	_____	_____	_____
29.	a physician	_____	_____	_____	_____	_____
30.	a medical technologist	_____	_____	_____	_____	_____

* * * * *

On an 8-point scale (1 being the highest, and 8 being the lowest) please rate to the left of the following according to STATUS in the hospital.

31. _____ x-ray technologist

32. _____ physician

33. _____ medical technologist

34. _____ administrator

35. _____ practical nurse

36. _____ nurse

37. _____ dietician

38. _____ pharmacist

* * * * *

On a 7-point scale please rate the following according to PAY SCALE

39. _____ nurse

40. _____ administrator

41. _____ pharmacist

42. _____ practical nurse

43. _____ medical technologist

44. _____ x-ray technologist

45. _____ dietician

In your hospital what is your estimate of the average amount of formal education (years post highschool) of the following

46. _____ registered nurse _____ years

47. _____ registered medical laboratory technologist _____ yrs.

Thank you very much!

APPENDIX B

Exhibit 1

WEIGHING OF THE RELEVANCE

Exhibit 1

Please check the variables #1 through #27, Part B (supra) as to importance for health team functioning. You may use the following scale:

V.I. - Very Relevant
M.I. - Moderately Important
Sl.I. - Slightly Important
Ir. - Irrelevant

	V.I.	M.I.	Sl.I.	Ir.
1. Persuasive	____	____	____	____
2. Adheres to hospital policies	____	____	____	____
3. Is organized in work	____	____	____	____
4. Is accurate in observations	____	____	____	____
5. Accepts suggestions well	____	____	____	____
6. Is aware of patients' physical needs	____	____	____	____
7. Is discreet in use of confidential information	____	____	____	____
8. Actively contributes to formulation of team policy	____	____	____	____
9. Accurate in carrying out procedures	____	____	____	____
10. Possesses respect for contribution of other team members	____	____	____	____
11. Has good patient relationship	____	____	____	____
12. Is tolerant of errors of other team members	____	____	____	____
13. Adheres to aseptic techniques	____	____	____	____
14. Has a good relationship with subordinates	____	____	____	____

		V.I.	M.I.	Sl.I.	Ir.
15.	Is willing to communicate downward	____	____	____	____
16.	Is aware of patients' emotional needs	____	____	____	____
17.	Seeks contributions of other team members	____	____	____	____
18.	Is willing to communicate upward	____	____	____	____
19.	Delegates responsibility	____	____	____	____
20.	Influences hospital policy	____	____	____	____
21.	Adapts easily to change in procedures	____	____	____	____
22.	Is willing to compromise when alternative measures are presented	____	____	____	____
23.	Has a good relationship with other health team professionals (i.e., physician to medical technologist to nurse, etc.)	____	____	____	____
24.	Has empathetic concern for patient	____	____	____	____
25.	Readily admits errors and omissions	____	____	____	____
26.	Has good relationship with peer members (i.e., physician to physician; nurse to nurse, etc.)	____	____	____	____
27.	Uses terminology understandable to specific team members	____	____	____	____

APPENDIX C

FIELDS WITH EXISTING ASSOCIATE DEGREE JOB-ENTRY PROGRAMS AND ASSOCIATIONS CONCERNED WITH PROGRAM DEVELOPMENT

APPENDIX C

Fields with Existing Associate Degree Job-Entry Programs	Associations Concerned with Program Development
Dental Assisting	American Dental Assistants Association and American Dental Association
Dental Hygiene	American Dental Hygienists Association and American Dental Association
Dental Laboratory Technology	American Dental Association
Environmental Health Technology	National Sanitation Foundation
Food Service Supervision	American Dietetics Association
Inhalation Therapy Technology	American Association of Inhalation Therapists, American Medical Association, American Society of Anesthesiologists, and the American College of Chest Physicians
Medical Laboratory Technology	American Society of Medical Technologists, American Society of Clinical Pathologists, and American Medical Association
Medical Record Technology	American Association of Medical Record Librarians and American Medical Association
Medical Secretarial and/or Assisting	American Association of Medical Assistants
Mental Health Technology	National Commission on Mental Health Careers
Nursing	National League for Nursing and American Nurses Association

Fields with Existing Associate Degree Job-Entry Programs	Associations Concerned with Program Development
Occupational Therapy Assisting	American Occupational Therapy Association
Ophthalmic Dispensing (Opticianry)	American Board of Opticianry, Guild of Prescription Opticians, and Better Vision Institute
Optometric Assisting	American Optometric Assoc.
Prosthetics-Orthotics Technology	American Orthotics and Prosthetics Association

Source: National Health Council, A Guide for Health Technology Program Planning (1740 Broadway, New York, New York 10019).

APPENDIX D

PERSONNEL NEEDS IN HOSPITALS: ACTUAL STAFF 1966 (ESTIMATED) AND ESTIMATED TOTAL NEEDED IN 1975

APPENDIX D

PERSONNEL NEEDS IN HOSPITALS: 1966 and 1975 for U.S.A.

CATEGORY OF PERSONNEL	Actual Staff 1966 (Estimated)	Additional needed for optimum care 1966	Estimated total needed in 1975*
Total professional and technical . . .	1,332,100	257,200	2,034,300
NURSING SERVICE:			
Nurse - RN	361,000	79,500	563,800
Licensed Practical nurse	150,600	41,400	245,800
Surgical technician	17,600	3,900	27,500
Aide, orderly (except in psychiatric hospitals)	374,400	51,300	544,900
Aide, orderly in psychiatric hospitals	117,600	18,500	174,200
DIAGNOSTIC SERVICES:			
Medical technologist	54,500	9,200	81,500
Laboratory assistant	14,600	2,500	21,900
Cytotechnologist	1,600	500	2,700
Histologic technician	3,900	700	5,900
Electrocardiograph technician	5,900	800	8,600
THERAPEUTIC SERVICES:			
Occupational therapist	4,100	2,300	8,200
Occupational therapy assistant	3,800	1,200	6,400
Physical therapist	8,500	2,900	14,600
Physical therapy assistant	5,200	1,100	8,100
Social worker	10,700	5,100	20,200
Social work assistant	1,500	500	2,600
Recreation therapist	3,800	1,600	6,900
Inhalation therapist	5,600	2,200	10,000
Speech pathologist and audiologist . .	1,200	500	2,200
RADIOLOGY:			
Radiologic technologist	24,000	3,900	35,700
X-ray assistant	6,000	900	8,800
PHARMACY:			
Pharmacist	9,400	1,900	14,900
Pharmacy assistant	5,600	900	8,300
MEDICAL RECORDS:			
Medical record librarian	6,300	1,800	10,400
Medical record technician	10,100	1,800	15,200
DIETARY:			
Dietitian	12,700	3,500	20,700
Food service manager	5,400	800	7,900
All other professional and technical .	106,500	16,000	156,800

*Estimated on the basis of present staff and additional needed to give optimum care; taking into account the expected increase (28%) in hospital beds between 1966 and 1975.

Source: AAJC Occupation Education Bulletin, November 15, 1963.

APPENDIX E

STATISTICAL METHODS

SIMPLE LINEAR REGRESSION AND CORRELATION

Where height is a variable denoted by X and weight is denoted by Y we look for a line that goes through the points $(X_i, \tilde{Y}_i)$, where X_i is the ith value of the independent variable and $\tilde{Y}_i$ is our best prediction of the dependent variable Y. The form of equation we shall consider first is

$$Y_i = a_o + a_1 X_i$$

which is the equation of a straight line with intercept a_o and slope a_1. If we define

$$\tilde{y}_i = \tilde{Y}_i - \bar{Y}$$

$$x_i = X_i - \bar{X}$$

we can write the same expression as

$$\tilde{y}_i = a_1 x_i$$

thus eliminating one unknown.

A simple expression for the slopes of the best-fitting lines through a scatter where "best fit" is defined as that line for which the sum of the squared deviations is a minimum. This relation still holds true for the stochastic case. For that line,

$$a_1 = \frac{\Sigma (X-\bar{X})(Y-\bar{Y})}{\Sigma (X-\bar{X})^2}$$

or

$$a_1 = \frac{\Sigma xy}{\Sigma x^2}$$

and

$$a_o = \bar{Y} - a_1\bar{X}$$

We can then write the expression for the best prediction of Y as

$$\tilde{Y}_i = [\bar{Y} - a_1\bar{X}] + a_1X_i$$

$$= \bar{Y} + a_1(X_i - \bar{X})$$

MEASURING THE "GOODNESS" OF REGRESSION--CORRELATION

The average squared error, better known as the variance of points around the best-fitting line, $\sigma^2_{y|x}$ is defined as before by

$$\sigma^2_{y|x} = \frac{\Sigma(Y_i - \tilde{Y}_i)^2}{N}$$

If the relationship between Y and X is "good" so that all the points in Y lie very close to their predicted values, then

$$\Sigma(Y - \hat{Y})^2 \to 0$$

and

$$\sigma^2_{y|x} \to 0$$

On the other hand, when the relationship between Y and X is "poor" so that Y is not predicted from the knowledge of X, then for each X_i there will occur a number of values for Y_i which represent, in essence, a random sample of values of Y from the total population. When this happens, the best estimate of Y is equal to Y, so that as

$$\widetilde{Y}_i \to \bar{Y}$$

$$\Sigma(Y_i - \widetilde{Y}_i)^2 \to \Sigma(Y_i - \bar{Y})^2$$

and

$$o^2_{y|x} \to o^2_y$$

We may summarize this by saying that when the relationship described by our linear regression line is "good," $o^2_{y|x}$ becomes very small. On the other hand, where the regression line does not fit, then knowing X_i will not help us, and $o^2_{y|x}$ will be no better than o^2_y.

We use this knowledge of the relationship between $o^2_{y|x}$ and o^2_y to define the goodness of a relationship. The measure we employ here is the proportion by which $o^2_{y|x}$ is smaller than o^2_y or

$$r^2 = \frac{o^2_y - o^2_{y|x}}{o^2_y}$$

where r is known as the Pearson product moment correlation coefficient. Note that if the relationship is good, then

$$\lim_{r^2 \to 1} o^2_{y|x} = 0$$

and if the relationship is poor, then

$$\lim_{r^2 \to 0} o^2_{y|x} = o^2_y$$

In this way r^2 takes on values between 0 and 1 proportional to the "goodness" with which we can predict Y from a knowledge of X.

The computational formula of r derived from its definition is

$$r = \frac{\Sigma[(X-\bar{X})(Y-\bar{Y})]}{\sqrt{\Sigma(X-\bar{X})^2}\sqrt{\Sigma(Y-\bar{Y})^2}}$$

TESTS OF SIGNIFICANCE

"t" Test of Significance Between Two Sample Means ($\bar{x}_1$ and $\bar{x}_2$).

(Use Fischer's t distribution)

Paired variates:

$$t = \frac{\bar{d}}{\sqrt{\frac{\Sigma(d_i-\bar{d})^2}{N(N-1)}}} \quad \text{with } N-1 \text{ degrees of freedom}$$

where $\bar{d} = \bar{x}_1 - \bar{x}_2$

$d_1 = x_{11} - x_{21}$

$d_2 = x_{12} - x_{22}$ etc.

N = sample size

Unpaired variates:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\Sigma_i(x_{1i}-\bar{x}_1)^2 + \Sigma_i(x_{2i}-\bar{x}_2)^2}{N_1+N_2-2}\left(\frac{1}{N_1}+\frac{1}{N_2}\right)}}$$

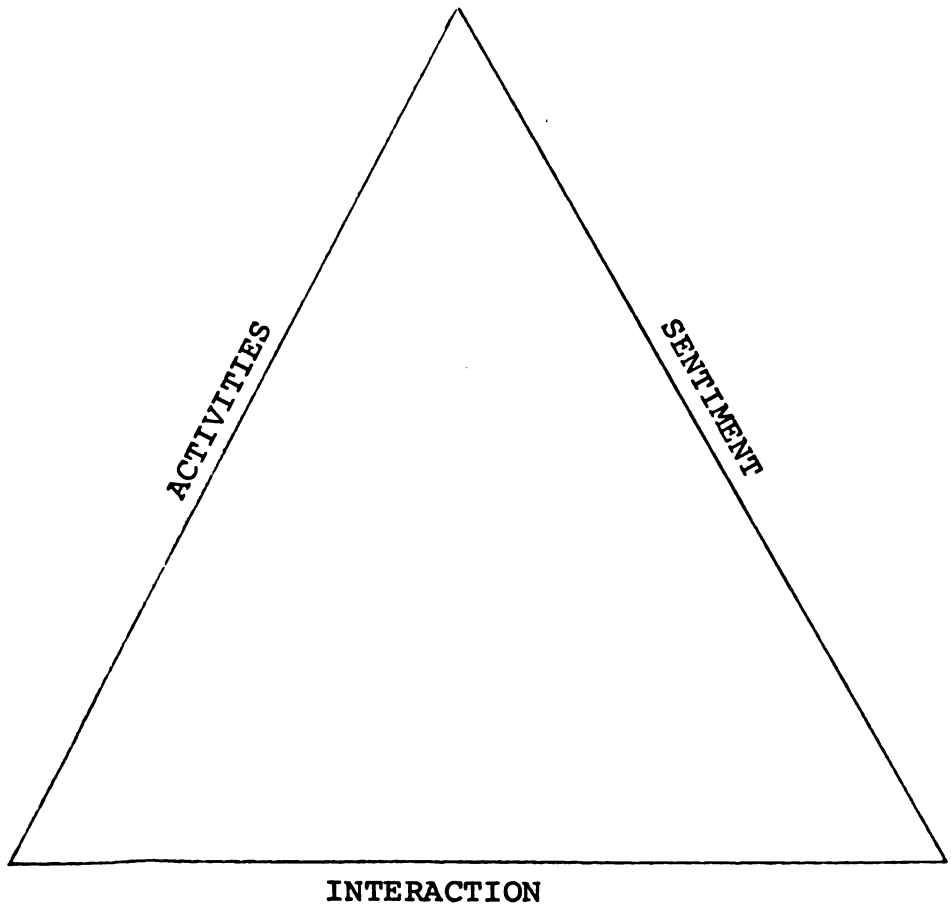
with $N_1 N_2 - 2$ degrees of freedom

where N_1 = size of sample 1

N_2 = size of sample 2

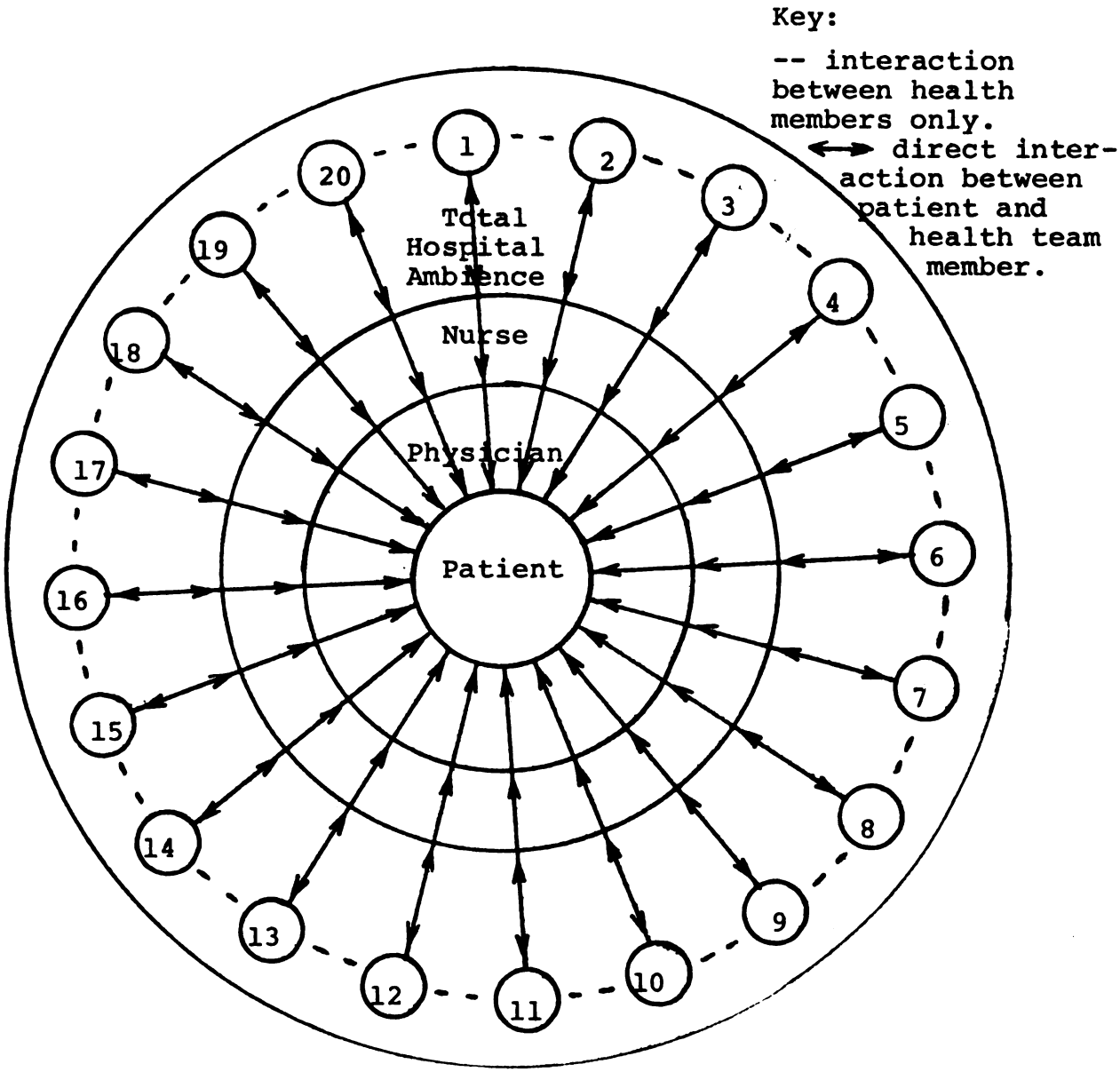
APPENDIX F

HEALTH TEAM MODELS



MODEL OF HEALTH TEAM FUNCTIONING*

*Based on Homans' Conceptualization of Group Behavior
The Human Group, Harcourt & World, New York, 1950.



1. Pharmacy
2. Occupational Therapy
3. Physical Therapy
4. Radiology
5. Clinical Laboratory
6. Chaplain Service
7. Housekeeping
8. Accounting Department
9. Social Service
10. Maintenance Department
11. Cardiology
12. Electro-encephalography
13. Pulmonary Function
14. Clinic Services
15. Public Relations
16. Dentistry
17. Dietetics-nutrition
18. Neuro-mental
19. Volunteer Service
20. Nursing Education

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