A MODEL OF INTERPERSONAL DYNAMICS WITHIN THE COMMUNITY HEALTH TEAM

Ъу

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ABSTRACT

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WITHIN THE COMMUNITY HEALTH TEAM by

ALAN FRANK FAIRAIZL

Submitted to the Alfred P. Sloan School of Management on May 11, 1973, in partial fulfillment of the requirements for the degree of Master of Science in Management.

A community health team is a group of people who provide both medical and social services to a community. The team is normally composed of people from many backgrounds: doctors, nurses, family health workers, and social workers. The goal of the team is to provide care to the entire family unit rather than simply individual patients.

The community health team's effectiveness is particularly sensitive to the relationships established by the team with the community; and equally important, the relationships between the members of the health team. Often these relationships are ignored, misunderstood, or illdefined. This thesis provides a formal systematic framework to define, visualize, and study the operation of the health team. The model which is proposed includes four major types of influences: the relationship of individual classes of members of the health team, i.e. doctor, nurse, or family health worker, with the community; the relationship between the one class of members of the health team with members of other classes; the relationship of the health center as an entity with the community as an entity; the relationship of the provision of service with economic constraints. These four interrelationships are described in detail in the thesis.

A computer simulation model has been developed to test the logical consistancy of the model and to demonstrate the dynamic nature of the interactions associated with health care. While the model still needs to be refined, the results are encouraging. A number of runs were made to determine if the model could demonstrate plausible behavior; the model appears capable of emulating patterns of operation of empirically observed community health centers.

The general framework which is described in this thesis appears to be a useful tool for developing a more precise set of definitions for the community health care problem, and can help provide better communication between the organizational psychologist, the medical personnel in the field, and the administrators responsible for the operating policy of community health centers. With refined definitions, the model should demonstrate the results of different policy decisions for a particular health center.

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CHAPTER I

INTRODUCTION

The concept of community health care has received much attention in the past few years. However, this attention has often been focused on a single aspect of the community health care problem. Very little has been done to integrate these various aspects into a cohesive whole. Consequently, the results of empirical studies often appear contradictory. While the theories which are proposed are probably correct, they must be qualified by other conditions which are often outside the range of the particular study.

This thesis describes a model of a community health team which includes both the provision of health care and the behavioral aspects of internal team operation and the relationship of the members of the team and the community. The goal of this work was to integrate the relationships between the team members, the community as an aggregate body, and the community as individual patients. Further, the model also includes the interrelationships such as the operation of the team, the demand for service, financial pressure from the operation of the center, and the administrative control process.

The model was developed over a period of 5 months. The basic

One exception to the more restricted approaches to the health care problem is "System Simulation of Program-Patient Interaction: An Application of Systems Dynamics to 'Treatment Drop-Out' in a Community Mental Health Center", Deborah S. Kligler, Ph.D., et al, Proceedings of the Summer Simulation Conference, Boston, Mass., June, 1971. The paper includes aspects of assessment of need for treatment, resources available to the center, and perceptions of need for treatment by the patient.

information used to construct the model came from personal interviews with members of the staff of community health centers, and the staff of the Sloan School of Management, Massachusetts Institute of Technology. While the values of the model parameters have not been refined, the results of the model runs are encouraging. The model has demonstrated behavior which is at least plausible. Further, refinements of the model parameters should lead to a more realistic behavior.

A number of model runs were made which indicated that goal orientation of the entire health team is a critical factor in the relationship of the health team to the community. Individual changes such as increasing the nurse's responsibility were not particularly effective when the health team had only moderate goal orientation towards the community. An interesting result is that increasing the doctor's ability to communicate is one of the most effective single changes tried. The change not only increased the community acceptance of the health team but also increased the quality of medical care given to the community.

Why a Computer Model of a Health Team?

A computer model of a community health team and its relationship with the community appears to be the only way of handling the complex relations inherrent in such a setting. The health center is in fact a very complex set of personal relationships as well as a vehicle for dispersing medical treatment. The members of the community interact as individuals with the individual doctors, nurses, and family health workers who provide the health services. The community acts as an aggregate through

the community boards and action groups. The aggregate community goals and desires are not necessarily the same as an individual's, and the community board and action groups influence the health center and the team through interaction with the health center administration. The administrator in his role as representative of the health center does not interact with the community in the same manner that an individual doctor and patient would. Further, internal to the health team there are interpersonal and professional relationships between doctor, nurse, family health worker, and administrator. The following illustration shows the interrelations between the individuals in this conception of the health team environment.

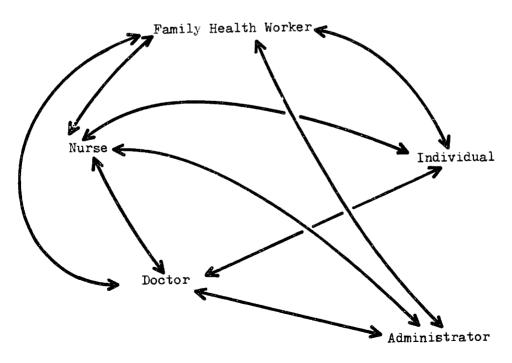
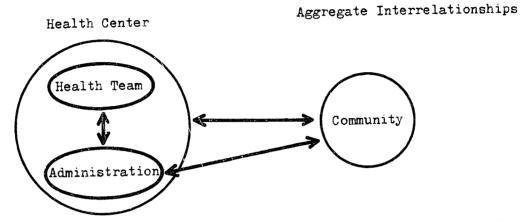


Figure 1 Individual Interrelationships

The aggregate interactions in the health team environment are displayed in the following illustration.

Figure 2



An accurate representation of the health team and its environment is the sum of these two sets of interrelations. A mental model which included the details of all the interrelationships would be unmanageable while a model which does not include all the relationships would be incomplete. The computer provides a mechanical means of keeping track of the relationships and permits the use of a much more complete model.

The use of a computer model allows this paper to explore the integration of reported studies on health teams. The previous work which is available in this field too often looks at only a narrow portion of the problem. Any extension of the concepts, the suggested approaches to delivering health care, or methods of developing better teams must be based on ceteris paribus assumptions. Unfortunately in practice, all things are rarely equal.

Often, two sir lar studies will show contradictory results. Why the results are different is often unclear. It is hoped that a more complex

and dynamic model which interrelates many of the individual studies will lead to an indication of why in one circumstance the results were effective and in another they were detrimental. It is then difficult to make comparisons between the different studies. Until now, no framework exists to integrate the results of the contradicting studies. This paper attempts to present a model framework in which this integration can be accomplished.

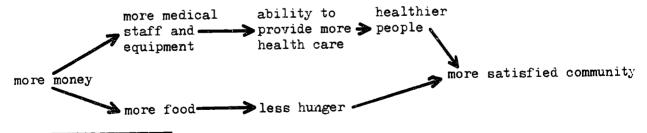
A simple illustration may help to highlight both the method of integration and the problems inherent in looking at only one aspect of a very complex environment. Let us look at two approaches of arriving at a more satisfied community. Both of these approaches will use what I define as a "simple linear solution". Let us use a diagramatical presentation for expedency.

Now let us look at a second method of arriving at a more satisfied community which may be especially pertinent to the ghetto community where poverty is prevalent.

more money more food less hunger more satisfied community

While these examples are trivial, they have an essential ring of

truth and in effect have been proposed in a much more sophisticated manner by a number of people as the solution to provide a more satisfied community and to limit community unrest. This example is in many ways similar to the frequent one-to-one relationships found in the studies of complex problems. As an example, the introduction of family health workers as members of the health team have promoted the overall effectiveness of the community health team. 2 On the other hand, the introduction of family health workers in other community health centers has not always met with the community's acceptance. 3 The resulting pressures and frustrations of both the family health workers and the other members of the health team have actually lowered the overall productiveness of the center. In many ways the suggestion to use the family health worker is parallel to the previous examples - add more family health workers and the dispensing of services should improve. One of the most important questions which must be answered is: why does this occur in one case and not in the other. If we return to the simple model and combine the two simple linear solutions:



²Ann Kieth, Assistant Medical Director - Brookside Park Family Life Health Center, private interview held at the Center, Jamaica Plain, Mass., January, 1973.

³Dr. Solomon Fleishman, (former Medical Director, Columbia Point Community Health Center, Dorchester, Mass.), private interview held at Harvard Community Health Plan, Boston, Mass., January, 1973.

The combination of the two solutions is possible since the inputs to the two solutions are identical and the goal is also identical. If we further recognize that the total supply of money is constrained, it becomes apparent that the problem is not only one of increase but also of allocation. The value of any increase in one leg of our new model depends on the balance of the previous state of allocation. The illustration also indicates one way to integrate the knowledge of practitioners in the field and the results of current studies. Rather than contradictory results, we have a compatible result which is now situationally dependent.

How Was the Model Developed?

The goal of the model is to integrate the current knowledge of community health teams. The information used in the development of this model was supplied by a number of different groups from various fields. The Organizational Studies Group of the Sloan School of Management has been working in the area of health team development, while the System Dynamics Group has been modeling various problem areas in health and health delivery systems. Both of these groups provided reports and useful insights into the interactions which occur in health teams and the problems occurring in community health centers. Members of functioning health teams were a major source of information. The Acknowledgement page lists the health centers in the city of Boston and the center staff members who provided the necessary information for the development of this model.

Since there were no previous formal models which related the interpersonal relationships with the working of a health center, I felt it was necessary to first develop a more generalized model, rather than model a specific health center. While a generalized model can't be immediately applied, it nevertheless avoids the possibility of ignoring factors which occur in different community health centers. By talking to members of different health centers it was possible to find alternative pressures and responses which might not be evident in one center alone.

The Current State of the Model

The model which this thesis presents is still in a crude form; however, it does provide a basic framework on which to develop a more accurate and useful model. This work then can be classified as a basically theoretical or more abstract effort which attempts to find a framework for attacking the problems associated with the relationships within a health team. The model runs that are included in this paper are for the purpose of demonstrating the type of output which will be available and the general characteristics of the model in its present form.

While a good deal of effort has been spent in making the internal relationship plausible, some relationships are still incomplete and will require further investigation by people who are intimately involved in the operation of the health team — the doctors, nurses, family health workers, and administrators. For this reason, only a limited effort was made to balance finely the parameters and values of the coefficients

of this model to produce totally realistic output. While an attempt was made to determine realistic values for the model, a great deal more effort will be required for the development of a model which truly reflects the operation of an individual health team.

The reasons behind the present state of the model are important and reflect the problems which will be encountered in any further work in the area. The first difficulty is the subjective nature of the problem. The model deals with interpersonal relations, with the perceptions of various team members, and with individual responses to perceptions and pressures. Series of situations and the resultant reactions have to be translated into general rules. Not only does the translation from situation to response have to be correct, but there is the everpresent danger that alternative pressures or reactions have been neglected. In interviewing, something may be missed in the formulation of the questions, in the responses given, or in the misinterpretation of the question or the responses. For the model to be useful it must not be so complex that it can't be understood. The development of descriptive rules is therefore more difficult. The model must be complex enough to be realistic, yet simple enough to be comprehensible.

Since the model is subjective it is prey to two other problems: faulty or nebulous definitions and self-deception. Having been involved in work on a theoretical model of human change and behavior originally developed by Professor D. Kolb^{4,5}, it became apparent that the more

⁴David A. Kolb, "A Cybernetic Model of Human Change and Growth", A Working Paper of the Sloan School of Management, Massachusetts Institute

people involved in the development of a subjective model, the more accurate and precise the definitions become. This is a result of the fact that each person has his own interpretation of the definitions in the model and these definitions have to be reconciled and refined as model development continues. Even with tighter definitions, the subjective nature of the problem allows one to become trapped by a conceptual argument which may not be correct. The only way to avoid this pitfall is to have a number of different people provide input for the model at different stages of model development. This prevents blindspots by challenges of conceptualization and highlighting of neglected areas. Changes in the model, which produce more plausible output without extensive justification for the change, defeat the purpose of the model. During the formulation of the model, the output provides the check on the consistancy and logic of the model. The computer later acts as an impartial judge which indicates when inconsistancy or logic errors exist.

of Technology, Cambridge, Mass., WP 526-71, 1971.

The model used by Professor Kolb and the model developed in this thesis are the outgrowth of a general modeling approach developed by Professor Jay W. Forrester in Principles of Systems (Cambridge, Mass.: Wright - Allen Press, 1968). The programming was done in a simulation language, DYNAMO II; the description of the DYNAMO language is contained in the DYNAMO II User's Manual (Cambridge, Mass.: The M.I.T. Press, 1970).

CHAPTER II

CRITICAL ASSUMPTIONS AND DEFINITIONS WITHIN THE MODEL

In this chapter a number of assumptions and definitions which play an important role in the development of the model are discussed. First and basic to the model is the definition of goal orientation and the differences in goal orientation between various members of the health team. Second is the definition of a synergistic goal orientation or the team goal orientation. Third, I discuss how the limits and changes in goal orientation, recognition levels, and desires are quantified. These topics are recurrent in the model and basic to the development of the entire framework. But before going any further the social worker must be mentioned.

The Inclusion of the Social Worker in the Health Team Model

While the social worker is a key element in the operation of the community health team, it appears possible to include the social worker implicitly in the model rather than explicitly. This is possible since the social worker's duties and responsibilities have elements of the duties and responsibilities found in the other members of the health team. The work performed by the professional social worker ranges from diagnosis and treatment of problems, counseling, providing supporting information to the rest of the health team, and being aware of community problems. While social workers do not have the status of the doctor, they have unique talents and training which make them experts in their field. And at varying times the social worker's status in the health team due to

the nature of the duties carried out is like that of the nurse, or the doctor, or the family health worker. There are elements of each of the other three members of the health team within the social worker and the social worker should react to some pressures to which each of the other team members are responsive. Figure 1 shows the interrelation paths between the members of the health team when the social worker is included.

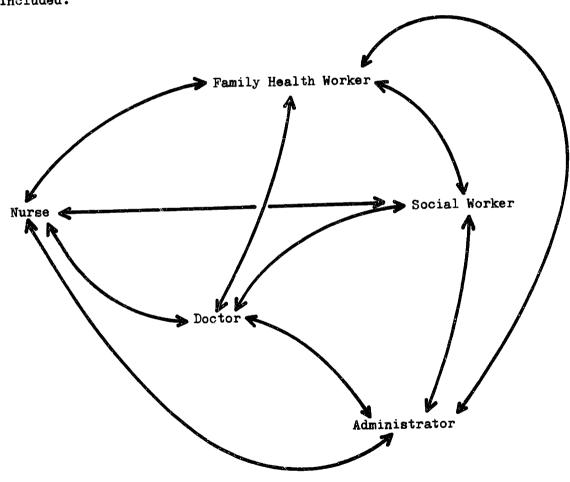
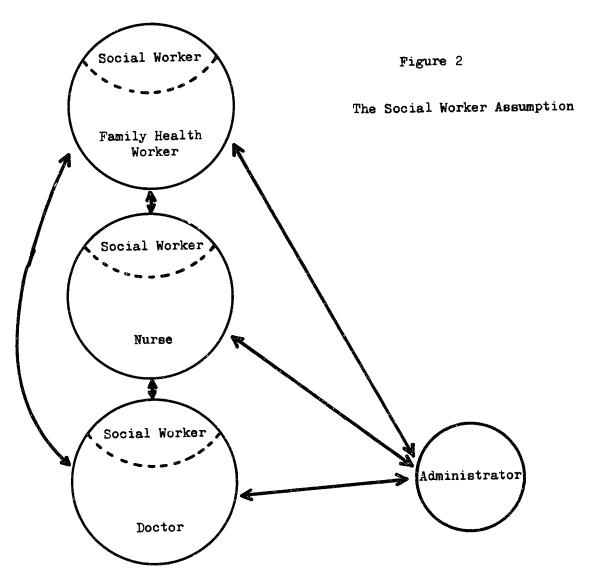


Figure 1

Interrelations in the Health Team

The following illustration shows the assumption made in this model.



The integration deletes the possibility of separate conflicts between the social worker and the rest of the health team in the model if the orientation of the goals of the social worker are very different from those of the rest of the team. If the goals are very different for the

social worker, the integration will not be justified and a separate segment will have to be included in the model.

Goal Orientation

Inherent within a model of interpersonal relationships is the question of goals. Within a model of this type there are goals for each of the groups - doctors, nurses, family health workers, and the goals of the community itself. Rather than modeling a myriad of goals (goal of self-improvement, a goal of being accepted by one's peers, etc.) for each of the above classes, the decision was made to develop an aggregate goal for each class. It was necessary then to develop a definition of goal orientation and also develop a scale which could be used to measure the degree to which a member of a class accepted the defined goal. Since some individually held goals are irrelevent only in that they detract from or lower the goal of health care, it seemed approproate to define goal orientation only in terms of what affected health care. The existence of competing goals irrespective of their nature would only lower the aggregate goal orientation towards health care.

Goal Orientation of the Doctor, Nurse, and Family Health Worker

The basic definition of goal orientation for these three classes is:
the degree to which the person is willing to promote the health care of
the community. However, we are still left with a definitional problem
of what is health care. In this case the definition of "health care"
is being used in probably its most liberal sense. Health care is defined

as the provision of services which promote the mental and physical well-being of the patient, family, and community which the health team serves, i.e. medical treatment for illness, preventative medicine, social work, and mental hygiene. The goal is to provide care not only as the individual's professional ethics dictate but also in consideration of the community's perceived needs.

Since the concept of goal orientation is subjective and difficult to quantify, a scale of zero to one was chosen. Zero signifies absolute lack of orientation towards health care while one is the ideal level of altruism. This is really no different than the commonly seen questionnaires which ask for choices between none-almost never-occasionally-fairly oftenvery frequently. The only difference is that rather than five choices, there is a continuous scale which runs from zero to one.

Goal Orientation of the Community

In the case of the community, goal orientation is defined as its level of acceptance of services which might lead to the increase in its well-being. As with the health team members, a number of competing goals are handled in the same manner. The scale is also zero to one. The zero level indicates that the community is not particularly interested in health care and definitely has no interest in the health team. When the level is one the community has interest in and accepts all methods which will contribute to their well-being.

Team Orientation

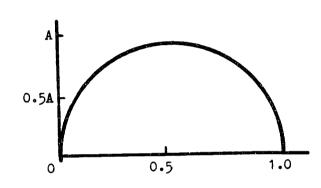
Team orientation is defined similarly to the class goal orientation such as the doctor's goal orientation. However, team orientation is or can be synergistic. Since it is a rather complex psychological phenomena and the actual effects of groups is open to debate, the value has been chosen as a simple average of the values of goal orientation of the doctor, nurse, and family health worker. Alternative team orientation functions which should be considered are a weighted average with the doctor's goal orientation given heavier weighting and more complex functions which might more closely relate to current group dynamics theories. This is one of the areas of the model construction which deserves more study and comment.

Limits and Canges in Goal Orientation, Levels of Recognition, and Desires

The phenomena of goal orientation, recognition of value and ability, as well as the level of desire have an element of commonality in the way these levels change as they approach their maximum or minimum levels. Each of these phenomena are influenced by a factor which I call commitment. To arrive at the maximum or "1" level requires "effort" by the individual. The same is true of the minimum or zero level. In the case of the "1" level, any competing goals will have to be lowered sufficiently that they will not detract. At the same time once an individual has reached a near absolute state in terms of goals or desires, he normally requires a great deal of effort or influence to increase or decrease his level. To illustrate better the implications and method by which

commitment affects these phenomena, consider goal orientation as a reservoir and a rate of flow into and out of the reservoir. The rate of flow corresponds to the rate of change in goal orientation. This rate is influenced by a number of factors. With commitment the rate depends not only on the other factors but also on the existing level of goal orientation. The effect of commitment is graphed in Figure 3.

Rate of change in the level of goal orientation for a given level of pressure to change = A



Level of goal orientation

Figure 3 Effect of Commitment

What this implies is that as goal orientation reaches either limit ("0" or "1") a greater pressure to change will be required to have the same rate of change as when goal orientation is near the middle of the range, i.e. 0.5. The use of this construction seems reasonable since someone who is only partially committed would seem to be more flexible than someone who was wholly committed to a goal. This construction is used frequently throughout the model.

The Chapters Which Follow

The foregoing section has described the more common elements and some of the major assumptions in the model. The next chapters deal with a detailed description of the model segments and their interrelationships.

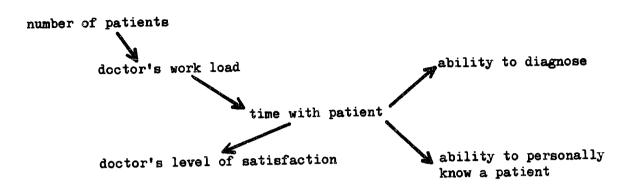
CHAPTER III

THE DOCTOR

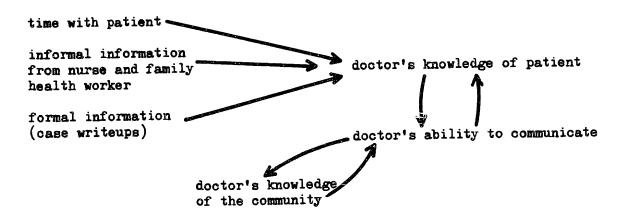
In this section of the model I treat the interaction of the doctor with the community as well as bring in the effects of information flow from the nurse and the family health worker. The perceptions of the community and the doctor play an important role in the dynamics of this model segment. The psychological aspects of the act of being treated are often as important or sometimes more important than the actual physical portion of the treatment of the patient. In many cases the patient will not be able to perceive improvement until after a considerable delay. Under these circumstances the perception of treatment is solely dependent on the patient's expectation of benefit and his faith in the doctor. Only after a much longer period will he be able to physically recognize the effects of treatment. The doctor at the same time can measure his effectiveness in two ways. The first is the success rate of treatment and the second is his perception of the patient's satisfaction with the course of the treatment and its outcome.

An important assumption in this section of the model is that the doctor comes to the center with a full complement of medical knowledge and skill. Further, during the time frame of the model the skill level of the doctor remains constant. Any improvement in performance comes through knowledge of the patient, both personal and case history, and knowledge of the community, i.e. what are common problems both in terms of disease and social factors?

The Effects of Work Load on the Doctor



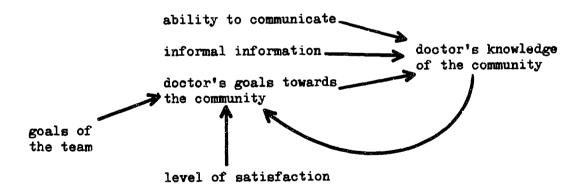
One of the basic inputs to the doctor-community loop is the level of work load of the doctor. This effectively can be translated into a measure of the amount of time that a doctor can spend with a patient (TWPAT). The time with the patient affects a number of other variables within the doctor-treatment loop. As the doctor's work load begins to increase, given an increase in the number of patients and a fixed amount of time available to the doctor to perform his necessary functions, the amount of time with the individual patient must decrease. Once the amount of time with the patient has decreased to a certain point, the doctor's ability to know the patient as an individual begins to lessen. If the amount of time with the patient decreases even further, his ability to diagnose which is a function of the amount of time he can spend with a patient gathering useful medical information also decreases, and effectively lowers the level of medical treatment the doctor can perform. In addition, there is a certain amount of time spent with the patient which the doctor would consider ideal and any deviation from this ideal amount of time will affect his personal satisfaction.



The doctor's knowledge of the patient (DKOP) is influenced by three initial factors. The first, as mentioned before, is the amount of time the doctor can spend with an individual patient. The other two are the informal information flows which are available through both the nurse and the family health worker and the formalized patient reporting system which the health team uses. The model separates the formal and informal information into two segments - (IINF) informal information and (FINF) the formal portion of the information that is characterized by the reporting system. The formal information system is characterized as a fixed level of information since most probably it will not change radically during the operation of the model and any changes over time can be accounted for exogenously. The formal information, however, is still insufficient to provide a total picture of the health or wellbeing of the patient. The amount of informal information which the doctor receives from the family health worker and the nurse is affected by a number of factors such as frustration felt by the individuals and their desire to communicate.

Even with a reasonable amount of time to spend with the patient, the doctor may find that communication is a problem. A middle class doctor beginning a practice in a ghetto community would find his initial ability to communicate quite low as opposed to a middle class doctor beginning a practice in a middle class neighborhood. The doctor's ability to communicate is basically a function of his knowledge of the community and his knowledge of the patient. If both of these factors are low, the ability to communicate should also be low. A low ability to communicate makes it more difficult to gain knowledge of the patient. If both the knowledge of the community and the patient are low, any increase in the ability to communicate would then have to come through the formal reporting system or more likely the informal information flow from the nurse and the family health worker.

The Doctor's Knowledge of the Community



The doctor's knowledge of the community (DKCC) depends on his ability to communicate, the team information flow, and the doctor's level of goal orientation towards the community. If the doctor is highly oriented towards helping the community, his level of knowledge of the

community should increase more rapidly since he will make an effort to gain as much as possible from the informal information flow. As his knowledge of the community increases, his ability to communicate should increase allowing the doctor to learn directly from his patients. The loop I have described has a positive feedback nature, in that the initial level of the doctor's goals tend to drive his goal farther in the same direction. There are two factors outside this loop which tend to change the doctor's level of goal orientation. One is the average orientation of the goals in the team towards the community (TO) as was discussed earlier. The second which would tend to provide an influence for change of the doctor's goals is the satisfaction level which the doctor has in doing his work. If he tends to be satisfied, he will probably be interested in participating even more to increase his own satisfaction.

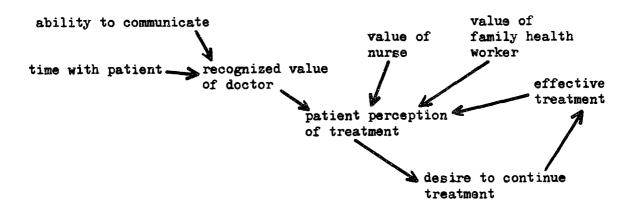
Diagnosis, Treatment, and the Patient

ability to diagnose effectiveness of treatment

To a first order the medical aspects of the treatment depend on the time the doctor can spend with a patient; his ability to communicate with the patient leads to an increase in his ability to diagnose. While a doctor may be able to diagnose the bulk of the patient's problems with medical tests alone, this method will be time consuming. The ability to communicate seems to be a prerequisite for speeding up this process and

leads to a much better diagnostic ability. This diagnostic ability (DATD) will determine the effectiveness of a course of treatment. The better the diagnostic ability, the more effective the treatment. The nurse and the family health worker's efforts in health care also affect the outcome of the course of treatment. The family health worker and the nurse maintain an awareness of the patient's prognosis, try to maintain the patient's continuation of treatment, and handle social or family problems that might be associated with the treatment. If the level of these three factors (the DATD, the family health worker's effectiveness and the nurse's effectiveness) are high, the effective treatment should be operative at a high level. But, the patient may not be aware of the physical or medical changes which are occurring until some later time. The patient's misperception is due to a time delay between the beginning of the course of treatment and the changes in well-being which the patient can observe. This effect is portrayed in the model as the perception of treatment by the patient (POT). This perception is only of the medical aspects of treatment, the change of the physical course of the disease or the problem which the patient is facing. The doctor's personal relationship with the patient and the patient's expectations also affect the patient perception of treatment. This is developed through the value of the doctor (VD). The value of the doctor to the patient depends on the amount of time a doctor can spend with the patient, which shows concern, and the doctor's ability to communicate, which tends to alleviate fears. The patient requires time to develop a rapport and to evaluate the real value of the doctor. This is basically through a time delay since a

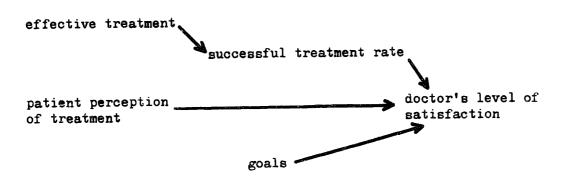
number of meetings with the doctor are required before the patient can estimate the value of the doctor. This then generates the recognized value of the doctor to the patient (RVD). Physical perception of the treatment and the recognized value of the doctor lead to what the patient actually perceives of the course of treatment (PPOT). This is also coupled with the recognized value of the family health worker and the value of the nurse.



Should the patient initially not have faith in the staff or in the benefits expected from treatment, his desire to continue treatment will be much lower. In this case it would lower the effect of the treatment that the health team is performing on him and after some delay once again lower the physical perception of treatment. The patient has made what amounts to a self-fulfilling prophecy: he didn't expect the treatment to do any good, didn't follow up the course of it and found out that especially after one visit he may have been no better off than he had been before he went to the health center! The treatment is only effective, even given top quality medical care, if the patient cooperates. If the effective treatment continues to be operative and the desire to continue

treatment is maintained, the successful treatment rate will be high unless there are any economic or social factors which might mitigate the quality of treatment.

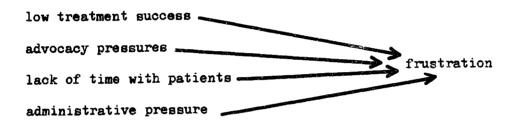
Factors Providing Satisfaction



The doctor can perceive the past treatment rate or the successful treatment rate (STR) over time through a delay in perception. This perception of the treatment rate will be used as one of the doctor's measures to evaluate himself. A second perception which affects the doctor is his perception of the patient's reaction to treatment (PPPOT). The doctor may or may not place great value on the patient's perception of treatment. If he is essentially looking at the practice of medicine as merely dispensing medical treatment and not considering the reaction of the patient, he will not weigh his perception of the patient's perception of treatment as highly as he would his perception of the successful treatment rate. The doctor gains satisfaction (DMSAT) through the perception of the patient's reaction to treatment, his perception of the successful treatment rate, and the amount of time he can spend with the patient. His perception of the reaction of the patient (PPOT) is

modified by the level of his goals towards the community. If they are high, he will place great value in the patient reaction to treatment. If his goals towards the community are low, he will place less value or emphasis on the patient reaction to treatment.

Frustration



Frustrations for the doctor can develop from a poor treatment rate, which indicates a lack of success in his medical techniques, and a poor patient perception of treatment, when his actual success of treatment rate is high if he is highly goal oriented towards the community. Frustrations also result from other interactions with the team. One is from high advocacy pressure which is discussed in the advocacy loop or the negative reaction of the staff (NRST). Frustrations can develop from too little time to spend with the patient, from pressures especially from the administration to control his method of treatment, and from the operation of his portion of the health team. Some of these pressures can occur when the health center is under strong financial pressure. The development of pressure due to administrative pressure is covered more fully in the financial-administrative section of this model.

CHAPTER IV

THE NURSE

The functions of a nurse in many community health teams have changed considerably over the formerly held conception of a nurse as merely an assistant to the doctor. The nurse-practitioner role is becoming increasingly more common. Rather than the nurse being simply an assistant, the practitioner role involves a greater degree of independent action and responsibility. The nurse over a period of time has taken over many of the more routine duties of the doctor. The medical treatments and medical tests which a nurse can perform are of course limited by the nurse's competence and by the legal and ethical boundaries, but over time these boundaries have changed. At one time the doctor made routine tests such as blood pressure: the testing of blood pressure was then delegated to the nurse, and now is frequently delegated to the medical aides. On the health team, the nurse performs many functions schedules, assists, performs simple medical diagnosis or tests, counsels, and educates patients. The nurse can act to a degree both as a family health worker and a doctor. In the health team situation, she finds that there is a status pressure which tends to make additional medical duties appealing, yet a counter pressure due to the ethical and legal bounds often make independent action on her part result in a feeling of insecurity and frustration. Whether the independence is frustrating often depends on both the attitudes of the doctor and the community. Work by the Organizational Development Group at the Sloan School of Management has

exceptionally suited to use her nurse's training in a family health worker mode of duties. However, status pressures tend to force the nurse in the opposite direction. Further, the doctor tends to equate responsibility with additional independence or at least more duties in the medical area. While in a sensitive health team the nurse can move towards the more interpersonal areas, this model endeavors to look at the more common reactions within the health team. It will therefore be assumed that the status pressure is the strongest and will normally cause the nurse to enlarge her duties and responsibilities in the medical area.

The nurse segment of this model looks at a number of features in the relationship between the nurse and her environment; the nurse's reaction to the community, the community's perception of her work and ability, the information flow between the family health worker and the nurse, and the doctor's perception of the nurse's ability. A distinction is also made in this model between the amount of effort devoted by the nurse to general health work and the level of medical treatment which she dispenses. While it is questionable whether these two facets of her work can really be separated, they are normally discussed in this manner by the majority of people involved in the health field and by the community health team staff which I interviewed.

Professor Irwin Rubin, Sloan School of Management, private conversation at Sloan School of Management, Cambridge, Mass., January, 1973.

² idem.

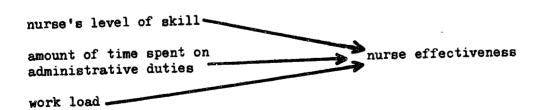
³ idem.

Skill Level of the Nurse

skills gained through additional responsibility

An external input in this section of the model is the nurse's level of skill (NLS). The nurse's level of skill includes her formal capabilities in both medical and sociological areas as well as any external training. The actual level of skill of the nurse (NLSK) depends both on the formal inputs and the level of medical treatment which she performs during the course of her work. If she is given more responsibility, the level of her skills should increase over a period of time. If she is not given the opportunity to increase the level of medical treatment which she provides, her skill level should not increase beyond her formal skill level.

Nurse Effectiveness

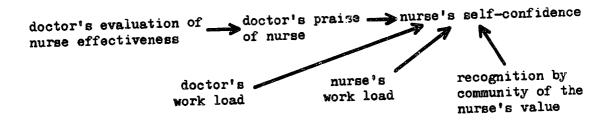


The nurse's effectiveness is a measure of how well the skills are used in dealing with individual patients. The effectiveness (NEFF) depends on a number of factors - the nurse's skill level, the percentage amount

of time which the nurse spends on administrative duties that can not be perceived by the community, and her work load. If her work load is high she is able to spend less time with each patient and her effectiveness drops.

The doctor then evaluates the nurse's performance based on her effectiveness and the amount of work she performs. This evaluation is made through the model function (DMNF) that decribes the doctor's measure of a ree effectiveness. This effectiveness leads to a level of praise by the doctor (DPON).

The Doctor's Role in Developing the Self-Confidence of the Nurse



Many people within the medical profession argue that the nurse training programs often train the nurse against taking personal responsibility. The model includes this fact by requiring that any major change in the level of self-confidence must by initiated by the doctor. The self-confidence of the nurse (SCONF) therefore depends on a

ARheba De Tornyay, M.D. and Abraham B. Bergman, M.D., "Two Views on the Latest Health Manpower Issue", American Journal of Nursing, 71(May, '71), 974-977.

number of factors, including the doctor's praise of the nurse. The second factor is the level of work (NWORK) which the nurse has to perform. If her work load is high, her self-confidence in her abilities to perform additional medical work will probably be low. The doctor's level of work also influences her level of self-confidence. If the doctor's work load is high, he is unable to work with the nurse in order to build up her level of confidence. In addition, the nurse's perception of the community's reaction to her new medical duties also plays an important role in determining her level of self-confidence. If she is highly valued by the community, it is more likely that she will develop a feeling of general confidence. If she is not valued by the community, it will be more difficult to feel confident with the patients.

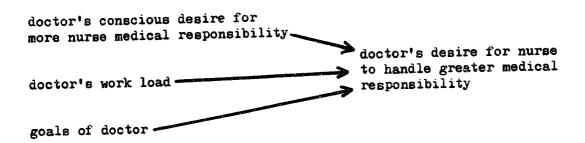
The Nurse's Desire to Increase Her Responsibility



Whether or not the nurse will desire to take on additional duties depends not only on her level of confidence, but also on what other pressures she faces in interacting with the health team. If her level of frustration is high, she will not be interested in attempting to take on additional medical duties, since any additional and more uncertain duties should increase the existing level of frustration. If her frustration

level is low and she has a high level of confidence, her desire to increase her duties and gain additional status should also be high.

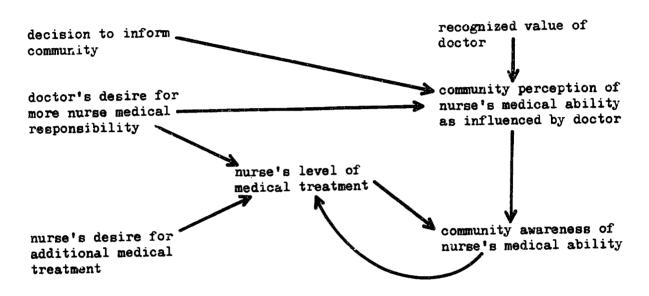
Doctor's Decision to Increase Nurse Responsibility



Within the health team, the doctor determines the limitations on the nurse's medical duties. We have to look to the doctor's desire for the nurse to increase her medical duties as well as her own self-confidence. The doctor's desire for the nurse to perform medical treatment (DDNMT) depends on his desire to increase the nurse's level of responsibility (DINR). This portion of desire to increase responsibility is predetermined external to the operation of the model. A second factor internal to the model also influences the doctor's desires. Independent of the doctor's conscious desire to increase the nurse's responsibility is the doctor's own work load which can create a pressure to delegate responsibility. If the doctor's work load is high and he is oriented towards the community, he will feel that it is necessary to delegate some of his work to the nurse to allow him more time with his patients. If his goals towards the community are considerably lower (even with an extremely high work load), he will tend to allocate less duties to the nurse. This may be

due to a desire to maintain his own status or excessive cautiousness on his part.

Development of Community Awareness

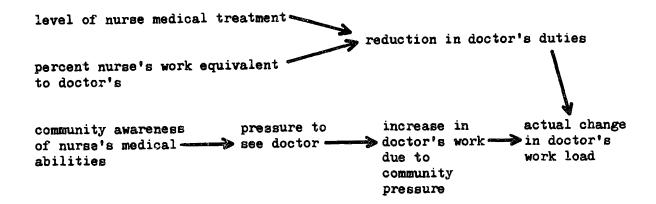


option of informing the community of his impression of the nurse's medical abilities, and his desire for her to take over certain duties. He may not do this for a number of reasons. Either he will consider that her ability should be self-evident to the community, or he may feel that it is not necessary. The model has been created so that the user can decide whether or not the doctor will prepare the community for an increase in the level of the nurse's medical work.

The level of praise of the nurse perceived by the community depends on how the community values the doctor. In other words, if the recognized value of the doctor is low, the community will tend to

disbelieve any praise from the doctor. They may feel that the doctor doesn't feel like doing the work and is attempting to ease his burden by delegating the work to the nurse. Alternatively, if the community values the doctor, they will more readily accept his decision. Through the doctor's praise of the nurse to the community and any preexisting medical treatment which the nurse gives to the community, the community develops an awareness of the nurse's medical abilities (CAMAN). This perception of the nurse's medical ability is also modified by the goals of the community towards a better health care (CPNMT). If the health care goals of the community are rather low, the community will be rather inflexible towards the method in which health services are provided, and they may not be interested in the nurse performing additional medical services for them. As community awareness of the nurse's medical abilities increase, it is likely that the nurse can more rapidly increase her level of medical treatment since she will have already gained acceptance from the community. Therefore, the change in the nurse's level of medical treatment depends both on her desire for increasing medical treatment (NDTMD), and the doctor's desire for her to increase medical treatment which are multiplied by the level of the community's awareness.

Reduction of the Doctor's Work Load



If the nurse's level of medical treatment increases, it is possible for her to take over some of the duties previously performed by the doctor and effectively reduce his work load. But, there are problems in the actual amount of reduction of the doctor's work load. As the rate of increase in the nurse's medical work rises, the nurse is able to reduce the level of the doctor's work load (RIDNM). It is assumed in the model that the reduction of the doctor's work load is a fraction of the addtional medical work performed by the nurse. At the same time if the community is not aware of the medical abilities of the nurse there will be a pressure to see the doctor, irrespective of the level of work that the nurse is accomplishing. Depending on the level of the nurse's medical work load and the level of community awareness, the doctor may have to compensate for the work that the nurse has done by performing brief examinations to corroborate her statements and to basically satisfy the patient's expectations. It is likely, when the nurse increases the level of her medical treatment by a large amount, the community

awareness will lag behind. Under these circumstances it is very conceivable that the doctor will not decrease his work load. If the lag in community awareness is too long, the doctor will believe that the nurse is not effective. He will believe he should maintain his level of medical treatment and not delegate any further work or responsibility to the nurse.

CHAPTER V

THE FAMILY HEALTH WORKER

The family health worker is the primary interface between the community and the health team. It is her job to make certain that necessary information is transferred between both groups. In addition, she provides a physical link with the community since she is normally a member of the community which she serves.

The abilities of a family health worker come from two sources - one innate and one through formal training. The innate source is her knowledge of the community, its mores, goals, and problems. Since the family health worker is a member of the community, she can reduce the "strangeness" of the clinic for the patient. In order to facilitate her role on the health team she has had a brief training period of approximately six weeks where she has been given a basic understanding of the operation of a health team, and a brief survey of medical and social problems which she may encounter. Her function is to take the patient through the health center, stay aware of the progress of the patient, encourage others to use the services of the health center, and encourage patients to continue treatment. Her key functions are interpersonal in nature, and her performance is influenced strongly by her own personal goals and aspirations, part of which are reflected in her goals for the community. Her effectiveness is directly affected by the pressures and frustrations to which she is subjected. The effectiveness she has is further modified by the perceptions of her personal abilities and goals by the community, the individual patient, and the rest of the health team.

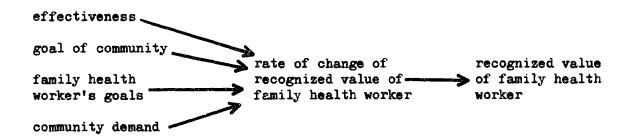
The family health worker evaluates herself by the reaction she perceives from the rest of the health team and the community. These perceptions and reactions play an important part in determining how much information can be transferred and setting the general tone of the relationship of the health center with the community. Ultimately, these reactions affect the quality and amount of care which can be delivered to the community. It is this type of relationship which this section of the model deals with. The remainder of this chapter will discuss the interactions which make up the family health worker portion of the model.

Since the actual training of the family health worker is episodic in nature (an initial training program with the occasional possibility of some short one day to one week courses), the level of skill is an external variable in the model which will be set at some level of skill at the beginning of the model runs. The second component which makes up the level of skill is the present state of the family health worker's knowledge of the community. Initially this would normally be at a very high level, since the family health worker does come directly from the community but this can change over a period of time due to a number of factors. These factors will be discussed later in this chapter.

Effectiveness of the Family Health Worker

The effectiveness of the family health worker can be modifified by two factors. One factor is the level of frustration which the family health worker feels. As the frustration level of the family health worker mounts, one would expect that her effectiveness will be reduced. Also as the frustration for all family health workers increases, an increase in job turnover would be expected. A finite period of time will be required for the new family health worker to become integrated with the health team. Therefore, even when frustration leads to job turnover, the aggregate effect is still a reduction in effectiveness. The second modifier of effectiveness on a per patient basis is the work load of the family health worker. As the work load increases, the ability of the family health worker to deal with one specific family will have to decrease.

Community Recognition of the Family Health Worker



The value that the community senses in the family health worker depends not only on this measure of the family health worker effectiveness (FEFF) but on the goals of the community. If the community's goals are different from that of the family health worker's, both in terms of health

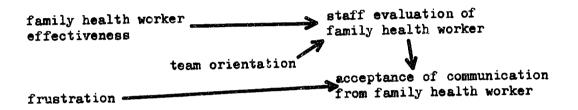
care and personal relationships, the family health worker's level of effectiveness is then modified by what the community perceives as effective. In many communities, health care is not the primary goal: the erradication of rats, the reduction of crime in the community, or economic improvement is the primary goal. Under these circumstances, the family health worker is not effective unless she is able to help solve these problems. Alternatively, the family health worker's goal orientation could be low relative to the community's. The low goal orientation in this case might result in a patronizing attitude on her part. In either case, the effectiveness of the family health worker as perceived by the community would be lower than her true technical effectiveness.

The actual effectiveness of the family health worker then depends on the goals of the population, the worker's own goals, and her effectiveness in a technical sense. This perceived effectiveness is integrated over time and is a measure of the recognized value of the family health worker to the community (RVFW). One factor which can lower the recognized value of the family health worker is the level of militancy or level of community demand (CDMND). If the community demand remains high over a period of time, the community may feel that the family health worker is ineffective in helping them gain their demands. Even worse, the family health worker could be suspected of aligning herself

Richard Beckhard, "Organizational Issues in the Team Delivery of Comprehensive Health Care", <u>Millbank Memorial Fund Quarterly</u>, L(July,'72), 289.

with the health care team rather than the community. Both results would cause the community to lower its estimation of the value of the family health worker.

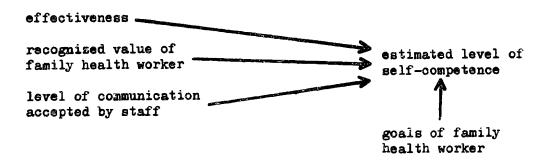
Staff Evaluation of the Family Health Worker



The other members of the health team also evaluate the effectiveness of the family health worker; but they evaluate her past performance from a different perspective than the community. The goal orientation of the health team as a whole weights the effectiveness of the family health worker. If the team orientation (TO) is low, i.e. the team is interested in the technical practice of medicine but not in the more interpersonal components, the staff's measure of the effectiveness of the family health worker (SLF) will be lower than another team which considers both the medical and personal aspects as important.

The staff's measure of the effectiveness of the family health worker determines how much communication will be accepted from the family health worker. The percentage of communicated information which is accepted (ACI) also depends on the general level of frustration of the entire staff including the family health worker. As frustration increases, one expects that the level of communication will decrease.

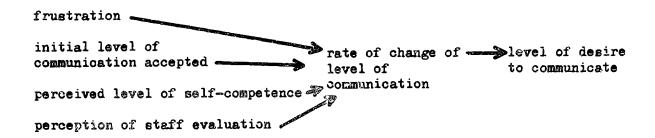
Self-evaluation



The family health worker also evaluates herself. She can perceive her total skill level, her past effectiveness, and recognizes unat level of communication is being accepted by the staff as well as the response of the community. These perceptions determine her self-estimated level of competence (LSC).

This segment of the model contains three separate perceptions of the effectiveness of the family health worker - the community's (RVFW) or the recognized value of the family health worker, her own value or the perceived level of self-competence (PLSC), and the perceived level of competence of the family health worker as recognized by the medical staff (SPL).

The Desire to Communicate



The family health worker in order to perform her work must communicate with the medical team. Initially, the family health worker has some level of desire to communicate (DTCF). This desire to communicate in influenced by three factors - her own self-perception of her level of competence, the magnitude of her frustration, and the past level of communication accepted by the health team. If she feels competent, she will be more likely to communicate. If she feels less competent in her ability to explain a patient's problems she will limit her communication. Similarly, she senses what the evaluation of the health team is of her qualifications. If the evaluation is low, this will limit her attempts to communicate information. If the health team's evaluation of her work is high, she will tend to offer more information.

Goal Conflicts in the Family Health Worker

goals of community

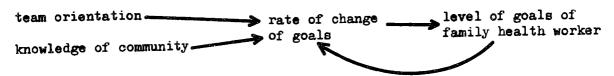
goals of family health worker

frustration due to goal conflict
health team goal orientation

The family health worker is faced with a number of pressures resulting in frustration. Some of these pressures are generated in other sections of the model and will be discussed in the appropriate sections. Within this model segment, frustration is generated by the dual allegiance of the family health worker. The family health worker is in a rather unique position much like a factory foreman — neither manager nor worker. She is not a medical member of the health team, yet she is

no longer a member of the community since joining the health team. leads to two separate pressures which can result in frustration. She must please two groups which may not have the same goals. The family health worker frustration function attempts to take this situation into account by looking at the difference between the goals of the family health worker and the goals of the community. As the difference between these goals increases, the frustration will increase. The family health worker is also affected by the goal difference between herself and those of the health team. It is conceivable that she can be too oriented towards the team from the viewpoint of the community, yet not oriented enough towards the team from the viewpoint of the doctors and nurses. If the difference between either of these increases, her frustrations will tend to increase. There is a case, however, where a difference in goals can exist but where frustration will not increase. The one case where a difference in goals will not have any effect is where the family health worker becomes totally aligned with the health team and the health team has a low goal orientation towards the community. This would tend to cause the family health worker's goal orientation to decrease. While a difference in goals would exist, the health worker would be less sensitive to the difference and would feel less frustration due to the difference. This reaction in the family health worker would be to the detriment of the team; however, since the team also has a low goal orientation, it would not perceive the difference.

Change in Goal Orientation

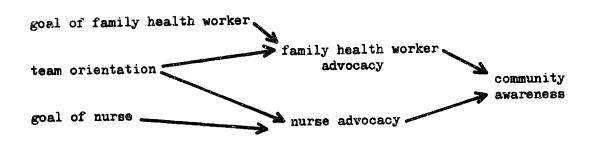


The previously mentioned pressures can work to modify the goals of the family health worker. The goals of the team as a whole can be described roughly as the average of the combined goals of the doctor, nurse, and the family health worker. This combined goal becomes the norm for the team. If the goals of the family health worker are very different from the norm, the family health worker will tend to change her goal orientation towards the norm to reduce dissonance. If the family health worker also retains a good knowledge of the community and its problems, this influence should tend to maintain or raise the level of her goals. These two forces compete with each other in the model.

CHAPTER VI

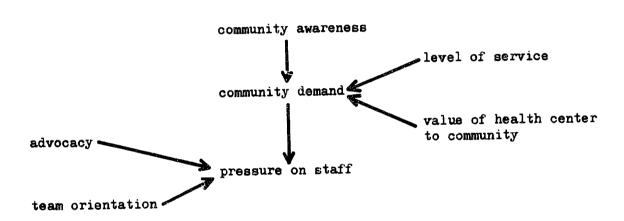
THE EFFECT OF ADVOCATES IN THE HEALTH TEAM

In this segment of the model we look at advocacy as a means of changing the level of service that the health team performs and at the same time the possibility that advocacy will lead to other reactions within the staff which will decrease the level of work performed. In the model the term advocacy is defined as the act of informing patients of health care which either is available or should be available and also placing pressure on the rest of the staff and the center administration to change the overall level of service or the direction of service of the health team. Further, this form of advocacy is that portion of the information or pressure which doesn't mee, the norm of the health team as a whole. In other words, if the goal of the family health worker is oriented towards the community much more highly that the rest of the health team, her efforts to help the community will exceed those deemed proper by the rest of the health team and perceived as advocacy. This is also true of the nurse. The pressures from the advocacy of the nurse and the family health worker are summed and the resultant pressure determines the effort which is made to change the awareness of the community.



The community can be made aware both of the existing health services and other health services which could be provided. Over a period of time the level of advocacy increases the community awareness. As the community becomes aware of the possibilities of the potential existing in the health team or which could exist in the health team, community demand can develop.

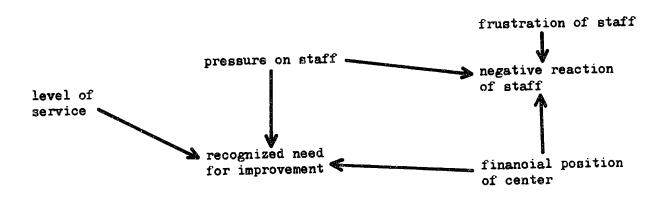
Community Demand and Pressure on the Staff



The strength of the community demand is dependent on the level of service. If the level of service is relatively high, close to the level of community awareness, then there would be little demand. If the awareness is high and the level of service is low, the response will be larger, i.e. the demand would be much greater. At the same time, a consideration has to be made for the community's general impression of the health center - their recognized value of the health center. If they value the center and if community relations are good, the militancy or pressure of community demand should lessen since there is more of an

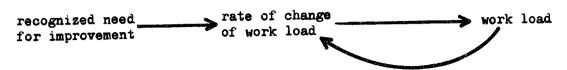
awareness of the staff's direct attempts to help the community get what service is possible. Thus community demand plus the advocacy directed towards the rest of the staff, notably the doctors and administrators, will lead to a pressure on the staff to change the service which the health center provides.

Recognition of the Need for Improvement



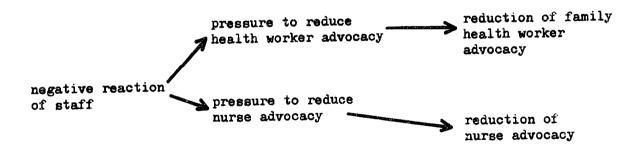
After some delay, the rest of the staff will sense that the pressure is recurrent and react to it. There are two possible reactions to this pressure. First, if the level of service is high in terms of an ideal goal there will be little desire to change the work load. If there is a negative financial pressure (FINPR), i.e. if funds are very limited, the staff will realize that any change in service has to result from a change in their own work loads. When there is a negative financial pressure and if the level of service is relatively low, the staff will attempt to increase their individual work loads. This need for improvement (NIMP) is recognized by the members of the staff, and they change their level of

work by an amount which depends on their existing work level.



If they are already at the limit of their capacity, the amount of change for any given acknowledged need will be less than if their work load is not as heavy. If the financial pressure is low, there will be little desire on their part to increase the work load since there are funds available which will allow this change in service to be accomplished through the addition of extra staff or equipment.

Negative Reaction of the Staff



If the level of work of each of the members of the health team is near maximum while the financial pressure is still negative, i.e. limited funds and the community demand continues, there will be continued pressure on the staff since the level of service cannot change under these conditions. Pressure on the staff under these conditions leads to a negative reaction of the staff. A means of relieving that pressure is

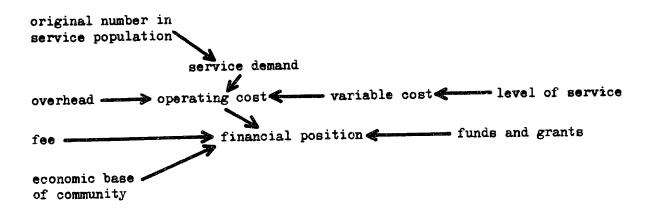
to put pressure back on the advocates to reduce the level of advocacy in the hope that the community awareness can be lowered.

CHAPTER VII

THE IMPACT OF FINANCES AND ADMINISTRATION OF THE HEALTH TEAM

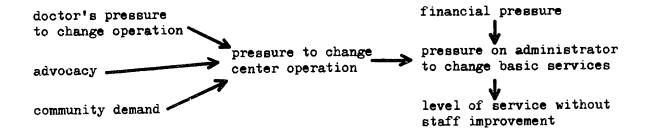
This section of the model attempts to interface financial pressures and realities of the health center which influence the health team. It deals with the frustration developed both in the administrator and the rest of the team from financial problems that occur during the operation of the center. The structure of this segment of the model is the result of two basic forces. The first is the quasi-accounting type structure in the cost section that allows for some latitude in the center's financial operation which differ between centers. The second portion of this model segment separates the service output of the center into two components. The first component is the level of service without staff improvement. Any changes depend on the financial situation and other pressures. These changes, if the level of service increases can be ascribed to the addition of other personnel who provide a fixed amount of work output. As an approximation I am assuming that their level of work will not change during the course of this run, while the work done by the health team may. A change in service demand will raise or lower this level of service. An increase in population will lower the service. inherent assumptions in this model segment are that an individual health team can change its work load and effectiveness and that any additional funds will just change the overall level of service without modifying the effectiveness of the specific health team.

Determining the Financial Position of the Health Center



The model then begins with an exogenous variable, the number of people within the health team service population (NUMBR). The number of people generate the service demand which the center sees. The required expenditures which the health center is faced with depends on any overhead which the center requires to maintain its operational status. In some cases the overhead is only a small fractional portion of the total operating cost of the health center and can very well be ignored. However, for flexibility I have left the option of including overhead in the model. The rest of the operating cost is the service demand or the number of patients times a variable cost that depends on the level of service that the center is providing. If the center provides only a minimal level of service the variable cost per patient would naturally be much less than if the level of service is raised. This operational cost is then subtracted from any and all income which the center receives. This income can be in the form of funds and grants provided by the state, federal, or local government, and fees collected from third parties or

payments by private individuals. Since most centers attempt to provide service to all those who need it within the area covered by the center or catchment region, the total amount collected in fees depends on two basic factors. The first is the percentage of the population that is financially able to pay and the second is the regulations and rulings concerning the initial granting of funds. In the case of some of the funds, certain restrictions are placed on who may receive treatment as well as regulations concerning who may pay for treatment. In some cases the regulations have been such that even those who can pay are not charged due to the funding rules and requirements. The average percent of the population which is expected to pay is reflected in (EBOA) the economic base of the area; in this case it is that group of the population which cannot pay or which the funds regulations have restricted from paying. This limits the amount of fees that can be collected by any center and also determines the amount of funds necessary to support the center in addition to any fee collection. This difference over time determines the financial position of the center. Should the operating cost be such that the inflow of funds does not meet the operating costs, this financial position will go negative indicating that the center does not have sufficient money to meet costs.

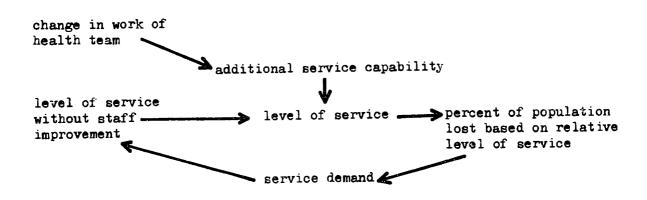


During the operation of the center there will be a number of forces which can cause a pressure to change the operation of the center (PTCOP). This pressure results from the doctor's pressure to change the operation of the center (DPTC), and advocacy pressure from the nurse and the family health worker (ADVF), and community demand (CDMND). As each of these three groups, after viewing the operation of the center and estimating the need for service, determines that the operation of the center is insufficient to meet these needs, its advocacy pressure to change the operation will increase. This pressure is perceived by the administrator after a period of time. The amount of time that it requires the administrator to perceive this pressure is a function of the frustration that the administrator is under. If the administrator is under very little pressure and has a low level of frustration, he will tend to be more aware of changes in the operation of the center and problems within the staff. As his frustration level rises, he may very well tend to increase the amount of time that it takes him to perceive any pressures from change in the system. In effect he is trying to delay perception of problems in order to decrease the frustration which he feels. This

delay then affects (DPTCA) the delayed pressure to change operations as perceived by the administrator. At the same time this effect also increases the delay with which the administrator can perceive any interpersonal problems within the rest of the staff of the health team. The administrator will normally perceive these problems as the frustrations of the members of the health team (FRUST) which is a composite of the doctor's, nurse's and family health worker's frustrations. The ability to change the level of service without any staff improvement results from the pressure to change the basic service. If the administrator's perception of the need for change is high and the financial pressure is positive, i.e. funds are available for change, he should be able to change the level of service to accomodate both the community and the rest of the health team. If the funds which have been given to him through the various grants are extremely restrictive, he may not be able to change even though these funds could supply a considerable portion of the money necessary to provide the change if the regulations were not so restrictive. If the financial pressure is large and negative, i.e. operating costs exceed the amount of income expected, the administrator will tend to reduce the level of service to maintain continuous operation. The amount of reduction will be tempered by any pressure he sees from the other members of the health team and the community. If the funding regulations are extremely restrictive, the administrator may not be able to lower the level of service without violating the funding requirements. In this case the financial pressure can worsen. The level of service can also change should the number within the population that the center

serves change. With fixed resources an increase in demand will result in a lower level of service per individual.

Level of Service Change Due to Change in Work of the Health Team



As described in the advocacy section of this model, the other members of the health team can also perceive the need for an increase in the level of service. If they are not overburdened with work at this point, they can endeavor to change the level of their work output, and effectively assign additional service capability to the center. This increases the level of service (LOS) and accounts for the staff improvement portion of the service output. The level of service that the center provides can also change the demand requested of the center. Since a certain portion of the population that the center serves does pay, this portion of the community should be able to obtain medical care elsewhere should they desire. Since the fees for service at health centers are normally competitive or less than conventional health care elsewhere, the prime determinant of choice of those who can pay but choose to

receive health care elsewhere then depends on the level of service. As the level of service decreases from an optimum level, a fraction of this population will seek their care elsewhere. As the service continues to decrease, a much sharper drop in the number who seek their health care at elsewhere would be expected. A plateau of those coming to the center is probably reasonable, since a number of factors such as transportation problems can limit the total number who can seek service elsewhere. Those who do leave reduce the service demand but also reduce the income of the center.

CHAPTER VIII

MODEL RUNS AND CONCLUSIONS

This chapter discusses the model runs, provides comments on the results of the runs and their implications, and makes concluding remarks on the overall thesis and model. There are seven runs described which provide insight into the general nature of the model. The financial—administrative section of the model appears to dominate the service characteristics when the health team goals are moderate to high. The model is also very sensitive to the goal orientation of the entire team. For a health team with high goal orientation, significant improvement in the interpersonal relations can occur. Further, changes in goal orientation also affect the community recognition and community demand. For moderate levels these effects are much less evident.

The Base Model Run

A base model run is used to make comparisons against later changes in the model. The initial values and coefficients which are used in this run, as well as the complete computer model, are contained in Appendix A. The initial values which will be of particular interest in this chapter are:

Nurse = 0.6 slightly higher than average

Doctor = 0.2 very low

Family Health Worker = 0.8 quite high

Community = 0.4 slightly less than average

for the general population (for a low income community this may be on the high side)

Initial Work Load

Doctor = 0.8

Nurse = 0.8

Family Health Worker = 0.7

All members of the health team have reasonably high work loads at the beginning of the model run. As the work load approaches "1", the endurance limit of the staff is almost reached and any further increase is difficult to motivate.

Skill Level

Nurse = 0.7 above average

Family Health Worker = 0.5 average

Doctor's Ability to Communicate = 0.3 moderately low (while the doctor's medical skill is considered high, the effectiveness is in part determined by his communication ability)

The level of skills relate only between other possible team members of the same class, i.e. the nurse's skills are relative to an ideal nurse's skills and do not offer any comparison between the doctor's skills and those of the nurse.

The model is run for a simulated period of 80 weeks or approximately one and one-half years. It is felt that the time period is compatible with the model construction since the model does not include the possibility that the health center will be able to significantly influence the morbidity of the community. During a period of one and one-half years migration in and out of the community as well as people

leaving or enrolling in the center should keep the morbidity rate constant from the health team's viewpoint.

A number of initial runs were made before the base run was selected. As mentioned in an earlier chapter, the model is still in a formative stage; however, some basic characteristics of the model can be demonstrated. It is also important to point out that the structure of the model affects the results as well as the values of the coefficients. Therefore, the changes in the dynamic behavior in the model can indicate trends even if the coefficients are not exact. It is these changes which will be discussed in this chapter. The plots of the values of selected variables for the base run are contained in Figures 1 - 9 found at the end of the next section.

Output of the Base Run

The financial segment of the model maintains a balance between the level of service and the service demand or the number of visits to the center (Figure 1). This is due to the financial constraints which limit the level of service and a counter pressure from the community, and the health team to provide the best service possible. The level of service increases by more than 25% at the end of 80 weeks. Part of the large change in the level of service is accounted for by a drop in the number of visits to the center (Figure 1). This drop is approximately 18% of the original level of service demand. In order to measure better the level of improvement or decline in the output of the center, two criteria have been developed. The first criterion, Service Level (MEASR), is the

product of the service demand times the level of service, which gives a material measure of staff output. The second measure is more closely related to the quality of health in the community health center patient population. This criterion is the Medical Level (MEDL) which the health center can provide and is the product of the effective treatment operative and the service demand. These two measures and the community demand, a measure of community pleasure or displeasure with the health center, provide a base to determine what possible changes can improve the operation of the health center.

In the base run the Service Level increases while the Medical Level decreases and community demand rises (Figure 2). This is partly a result of the recognized value of the family health worker dropping and going to zero in the 23rd week (Figure 3). The patient perception of treatment depends in part on the recognized value of the family health worker. The patients' lowered perception of treatment (Figure 4) reduces the patient desire to continue treatment. The reduced desire for treatment then lowers the effective treatment rate since the patient will not continue with the treatment. In addition, the reduced desire to continue treatment reduces the number of patient visits at the center (SDMND).

FINANCIAL AND SERVICE VARIABLES

level of service = L in arbitrary units

cumulative deviation from budget = F in thousands of dollars

service demand = # number of visits

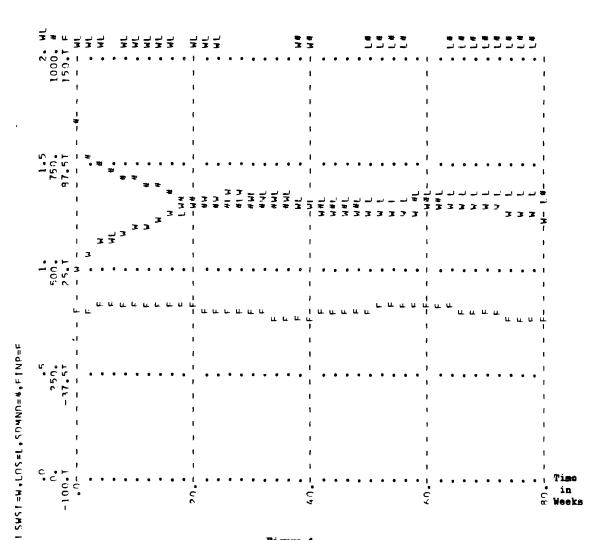


Figure 1

CRITERIA

Medical Level = * in arbitrary units

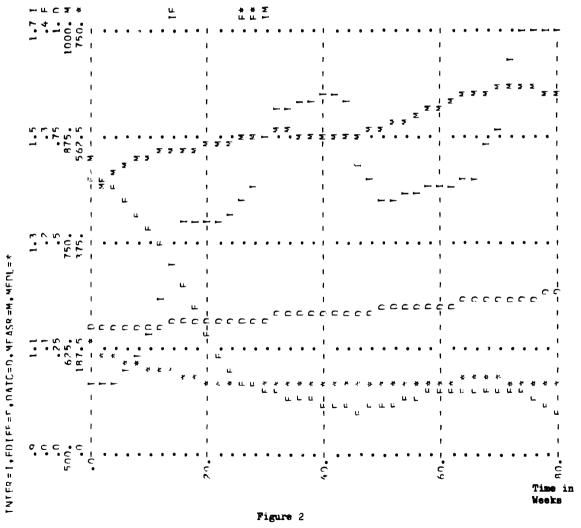


Figure 2

RECOGNIZED VALUE OF THE FAMILY HEALTH WORKER

Recognized value of family health worker = F in arbitrary units

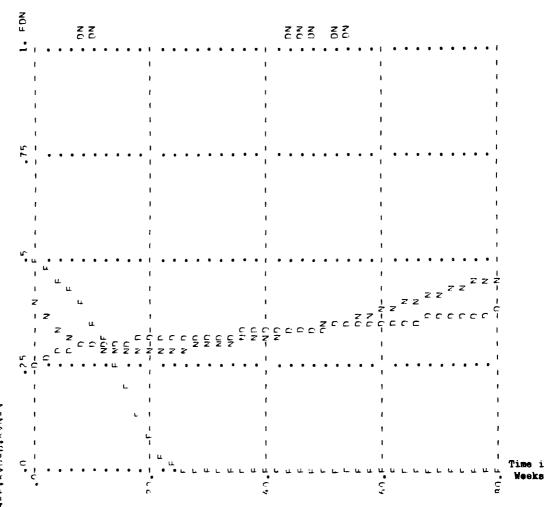


Figure 3

RVFW=F,RVN=D,RVN=N

PATIENT PERCEPTION OF TREATMENT

patient perception of treatment - P in arbitrary units

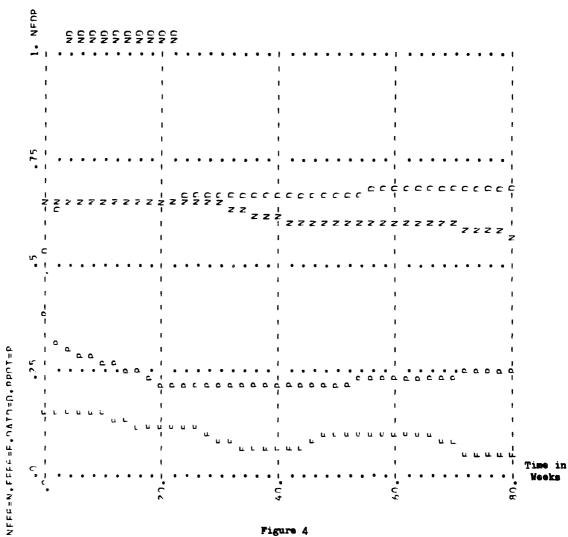


Figure 4

Community demand = C in arbitrary units

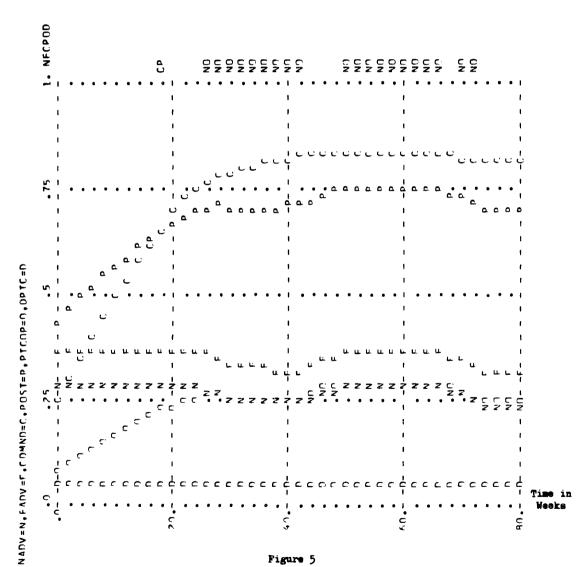


Figure 5

HEALTH TEAM GOAL ORIENTATION

Goal orientation of family health worker = F in arbitrary units

Goal orientation of doctor = D in arbitrary units

Goal orientation of nurse = N in arbitrary units

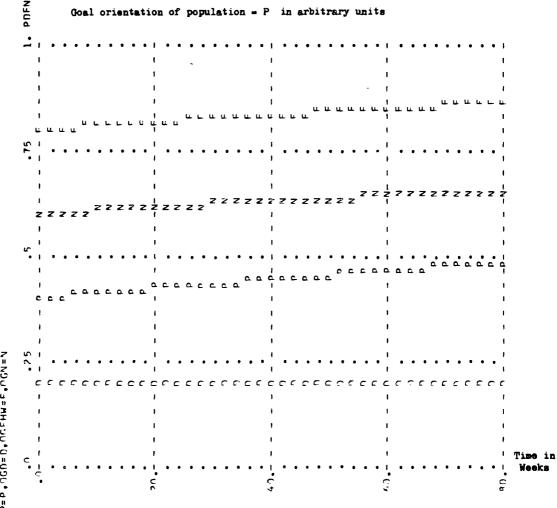


Figure 6

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KNOWLEDGE LEVELS AND COMMUNICATION

Amount of FHW communication accepted by staff = A in arbitrary units Family health worker's knowledge of community = F in arbitrary units Murse's knowledge of community = N in arbitrary units

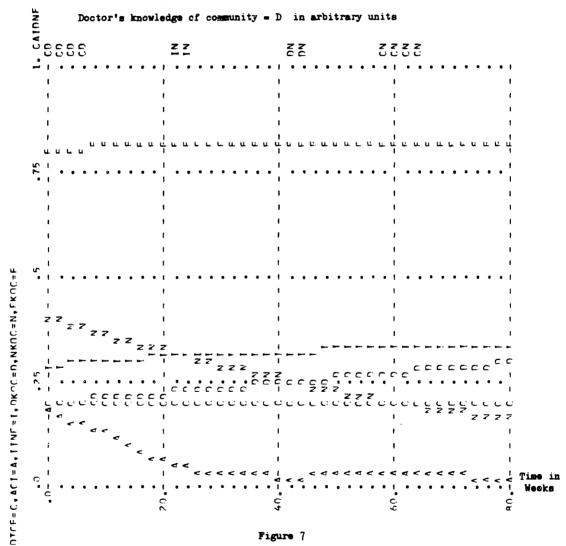


Figure 7

LEVEL OF FRUSTRATION

Frustration level of family health worker = F in arbitrary units Frustration level of doctor = D in arbitrary units

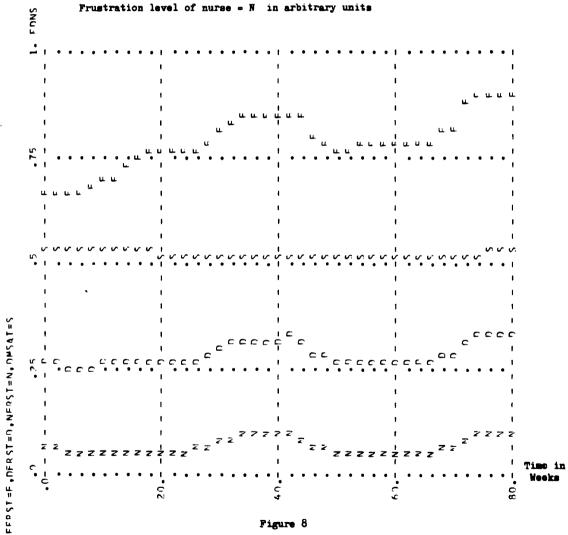
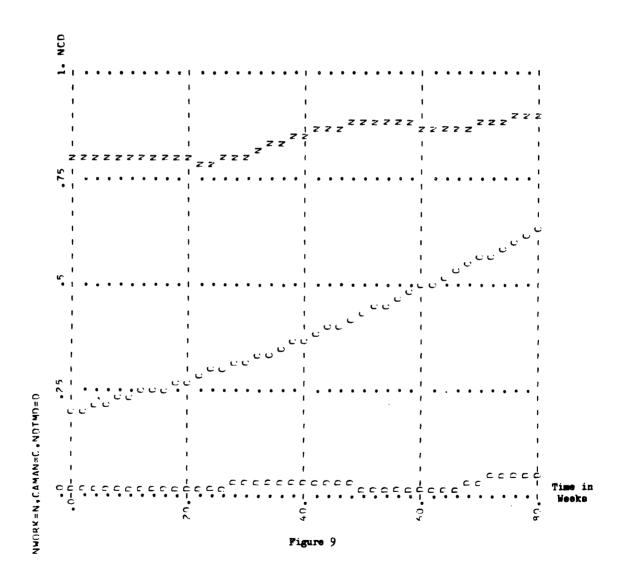


Figure 8

NURSE DESIRE FOR MEDICAL TREATMENT WORK

Level of nurse desire = D in arbitrary units



Further Experiments With The Model

RUN 2 - A Health Team With High Goal Orientation

| The changed values are: | Old | New |
|----------------------------|-----|-----|
| Goal orientation of doctor | 0.2 | 0.8 |
| Goal orientation of nurse | 0.6 | 0.8 |

This run is used to determine what improvement occurs if all goals of the members of the health team are higher than the base run. This change is expected to have considerable influence on the behavior of the model. The purpose of this run is two fold; to determine what happens as the result of a major initial condition change and to see if the selection of personnel using goal orientation would be important to the success of a health team. The policy of selection would be useful in the development of new health centers.

The results in comparison with the base run and by the 80th week are:

- A decrease of 25% in the level of community demand and a similar reduction in the pressure to change the operation of the center.
- 2. The recognized value of the family health worker does not reach zero until the 57th week and the recognized value of the nurse improves by 50%.
- 3. The goals of the population rise by 20%.
- 4. The doctor's knowledge of the community increases by 50%.
- 5. The two criteria, Service Level and Medical Level remain

the same.

This run indicates that high goal orientation does improve community relations, but does not necessarily improve the quality of medical care to the community. Further, high team orientation is not sufficient to improve the value of the family health worker as recognized by the community, given the conditions described in the model. The limited change in service criteria is to a good degree controlled by the constraints of additional work load available and the amount of funds available to the health center. This run shows a dominance of the financial loop when community relations are moderate to good.

The results of the run from a purely medical point of view are only cosmetic. The next model run attempts to determine if there is an alternative way to produce this affect.

RUN 3 - Increased Doctor's Ability To Communicate Given The Original
Goal Orientations

| The changed value is: | <u>Old</u> | New |
|--------------------------------|------------|-----|
| Doctor's ability to communicat | te 0.3 | 0.6 |

It might be possible to increase the ability to communicate by giving the doctors special training before they enter practice at a health center. The training might involve understanding street language and to develop in the doctor the ability to convert medical terminology into a more understandable form for the patients.

The results in comparison with the base run and by the 80th week are:

- 1. Community demand decreases by 12%.
- 2. The service demand increases slightly.

- 3. The recognized value of the doctor increases by 75%.
- 4. The medical level criterion improves slightly.
- 5. The doctor's knowledge of the community increases by 30%.
- 6. The doctor's goal orientation remains the same.

This run provides many of the improvements found in the high goal case (Run 2). The ability to communicate increases the patient's perception of treatment which in turn increases the desire to continue treatment. The continuation of treatment is responsible for a large percentage of the increase in the medical level criterion. The other contribution to the medical level criterion is the improved diagnostic ability of the doctor due to better communication with the patients.

RUN 4 - The Nurse and Family Health Worker Have High Goal Orientations
The changed value is:

| 'he | changed | value | is: | | <u>01d</u> | <u>New</u> |
|-----|---------|---------|--------|-------------|------------|------------|
| | | Nurse ' | s goal | orientation | 0.6 | 0.8 |

This run investigates the possibility that an increase in the goal orientation of the nurse is sufficient to cause a significant improvement in the operation of the health team. Attitude awareness programs and other nurse training could be carried on in nurse practitioner programs before the nurse joins the health center. A greater change in goal orientation might be possible since nurses appear to be more flexible in terms of being more readily able to change their attitudes.

The results in comparison with the base run and by the 80th week are:

1. The community demand drops slightly.

- 2. The service demand and the level of service remain the same.
- 3. The recognized value of the nurse increases 20%.
- 4. The patient perception of treatment is the same.
- 5. Both the service level criterion and the medical level criterion remain the same.

The overall improvement resulting from the change in the nurse's goal orientation is not significant. The nurse has adjusted to the operation in the center and the pressures bring the responses back to a normal range. There is a threshold effect which requires an increase of the entire team goal orientation to shift in order to obtain significant improvement. While the model is basically described as the interrelation of responses and pressures, the structure of the model causes the output of the health team to be less correlated with the changes which occur with individual members.

RUN 5 - Increasing The Family Health Worker Skill Level In A Highly Community Goal Oriented Health Team

| The changed values are: | <u>01d</u> | New |
|----------------------------------|------------|-----|
| Family health worker skill level | 0.5 | 0.8 |
| Goal orientation of nurse | 0.6 | 0.8 |
| Goal orientation of doctor | 0.2 | 0.8 |

In all previous runs the recognized value of the family health worker declines to zero between the 23rd week and the 57th week. Since

many actual communities do not reject the family health worker, it is necessary to see whether the model has been constructed so that it is possible to increase the value of the family health worker.

The results by the 80th week are:

- 1. The recognized value of the family health worker rises to nearly 1 by the end of the period.
- 2. The amount of communication the rest of the health team accepts from the family health worker rises by a factor of 7 over the value found for accepted communication in Run 2 (the all high goal run).
- 3. The medical level criterion rise significantly (52% increase) over the final level of the all high goal run.
- 4. The patient perception of treatment rises 50% over the all high goal run.
- 5. The level of service criterion at the end is once again approximately the same as the base run.

This run demonstrates again the critical nature of the initial conditions in determining the operation of the model. The run also demonstrates that the recognized value of the family health worker is not always forced to a low value.

The marked improvement in the medical level criterion is due to a number of factors. Increased communication from the family health worker leads to better information on which to base help and treatment.

The overall increases in the recognized value of the health team members

provides a higher perception of treatment as well as some actual quality improvement. The perception once again leads to a greater desire to continue treatment, thus improving its effectiveness.

RUN 6 - Increasing The Doctor's Desire For Greater Nurse Responsibility

| The changed values are: | <u>01d</u> | New |
|---|------------|----------|
| Amplitude of desire (AMPL) | 0.0 | 0.8 |
| Time at which the decision is made (STTM) | _ | 10 weeks |

The decision to increase the nurse's responsibility was made in the 10th week of the model run. The expected effect is that the nurse will increase the amount of medical treatment duties. However, the change in medical duties depends on the self-confidence of the nurse, her desire for additional duties, and the community acceptance of her modified role.

The results in comparison with the base run and by the 80th week are:

- The community level of acceptance of nurse medical work is virtually the same.
- 2. The level of nurse medical treatment is virtually unchanged (slight increase).
- 3. No major differences were found between this run and the base run.

The major reason for little change in the level of nurse medical treatment is the relatively low level of the nurse's desire to take on additional medical duties and only a moderate acceptance by the

community during the 80 week period.

RUN 7 - Informing The Patients As Well As Increasing The Doctor's Desire
For Nurse Medical Responsibilities

| The changed values are: | 2 | 01 <u>d</u> | New |
|--|---------------|-------------|----------|
| Level of desire | (| 0.0 | 8.0 |
| Time at which decision made (STTM) | sion | - | 10 weeks |
| Decision to promote to community (SWT1 zero implies yes) | nurse = 0, | 1 | 0 |

In the previous run (Run 6) the doctor encouraged the nurse to assume greater medical responsibilities, but he made no effort to prepare the community for the nurse's changing role. In this run the doctor praises the nurse's medical ability to the patients of the health center. The goal of the doctor's effort is to make the nurse's role change as easy as possible by preparing community acceptance.

The results by the 80th week are:

- 1. An increase of 40% over Run 6 in the level of community awareness of the nurse's medical ability.
- 2. Community demand begins to fall below the values in Run 6 after the 60th week. By the end of the run there is a 6% decrease in the level of community demand over that in Run 6.
- 3. The level of nurse medical treatment increases significantly over that of Run 6.

- 4. The recognized value of the nurse increases by 33% over both the base run and Run 6.
- 5. The medical level criterion and the service level criterion are essentially the same as the base run.

Comments on the Model Runs and Results

Once again it is important to stress the limited validity of the present values and coefficients used in this model. Much work still needs to be done; however, the general nature of the changes which occur in the model are representative of the trends which this model predicts. To use this model to determine concepts of policy alternatives will depend greatly on the initial conditions of the health center. This is demonstrated by the difference in results between the original goal case and the all high goal case. Since there are many functions in the model which have a "critical" nature, i.e. the value of the output changes much more rapidly as the input to this function passes through a certain range of values, the structure of these functions must be better defined. The reader will also notice that many of the runs involve initial value changes in the model. The reasoning behind the decision to change the model values in this manner is twofold; first, it is a policy consideration and secondly, these changes provide some bounds on the operational limits of the model without having to consider realistic times for change (further work is necessary to better define these times). The policy consideration is based on the normally high work load of the

health team. Many training sessions and other on-the-job training methods are at best difficult or impossible to implement due to the limited time the health team can or wishes to spend on training. 1

Therefore, one policy approach would be to attempt training and attitude awareness sessions before the staff joins the health center team; this is the approach chosen for many of the model runs.

The general trends in the model runs indicate, over the very long term, that the positive loops within the model may dominate behavior and attitudes. The simulated run time should be increased; however, the assumption of a constant morbidity rate as seen by the health team must be more rigorously justified to allow for longer run lengths. In addition, health centers are often located in communities which are in a state of economic transition. The present model does not account for community attitude or goal orientation change which results from the changing economic and social characteristics of the community.

Future runs of the model should include changes which can occur within a practicing health center. The model with minor modifications should easily lend itself to intervention approaches as practiced by behavioral psychologists. This may be accomplished by providing functions which allow for increases in communication between team members and also lower the negative pressures which result from differences in goal orientation between team members.

Dr. Solomon J. Fleishman, (former Medical Director of Columbia Point Health Center, Dorchester, Mass.), private interview held at the Harvard Community Health Plan, Boston, Mass., January, 1973.

Final Comments

The results of the model are encouraging. The general characteristics of the model appear to relate to empirical observations of health centers. The model is capable of demonstrating significant improvement in performance for a given policy under one set of circumstances and little or no improvement if the initial conditions are different. This model can be used to simulate different results from empirical studies of the behavior of two different health centers given the same policy at both centers. Further, the model formulation has provided the author with a cohesive conceptualization of the interrelationships which abound in a community health team and their relationships with the center administration and the community. In addition, the model provides the ability to manipulate both structures and values to determine possible outcomes of policy decisions. It is hoped that the dynamic model structure can provide a similar benefit to others who are interested in this area of health care. Should further work be carried on in the development of this model, the model development team should be composed of people from a number of diverse fields. The team might ideally be composed of a systems dynamics practitioner, members of community health teams, a representative of the community which the health team serves, and a behavioral psychologist to promote the operation of the team and provide the theoretical background of interpersonal interactions.

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APPENDIX A

PAGE 1 A MUDEL UP A HEALTH TEAM 4/24/73

AUVULALY SEGMENT

| | ADVUCACY SEGMENT | | | |
|--------------------|--|------------|-----|---|
| NAI) V . h = (1 - | TO.K)*(1-PUNA.K)*OUN.K | 59. | Δ | |
| | - NUKSE AUVULALY | • | | |
| To | - TEAM GUAL URIENIATION | | | |
| | - PRESSURE UN NURSE AUVUCATE | | | |
| CGN | - CRIENTATION OF GOALS OF NURSE | | | |
| C G 14 | CRIENTALION DI GORES DI NONSE | | | |
| FACV.K=(1- | TU.K)*(1-PUFA.K)*UGFHm.K | 60, | A | |
| FADV | - HH ADVULALY | | | |
| ۲u | - TEAM GUAL URIENTATIUN | | | |
| PUF A | - PEKCÉNI PKESSUKE UN FHW | | | |
| UGFHm | - GUAL URIENTATION OF FHW | | | |
| | | | | |
| ADVS.K=NAC | V.K+FAUY.K | 61, | A | |
| | - ADVUCACY SUPPURT | | | |
| VUAN | - NUKSE AUVULALY | | | |
| FAUV | - FHM ADVULALY | | | |
| | | | | |
| | HARLO TO THE TOTAL ON THE TOTAL OF THE TOTAL | 62, | L | |
| CAWAR.J) | /TAU | 42 1 | | _ |
| TAD=10 | | 62.1 | - | |
| LRAWR=5.2 | | 62.2 | ۷, | L |
| CAWAR | | | | |
| ADV2 | | | | |
| | - LOSS RATE PERIOD RELATIVE TO TAD | <i>.</i> . | | |
| TAD | - TIME DELAY ASSUC. WITH GAINING AWARENE | 22 | | |
| COMNO Z-CA | WAR .K *TABHL(CDM, (LUS.K*RUBC.K), U-1, 0.2) | 63, | Δ | |
| CDM=1/1/.6 | | 63.1 | | T |
| | - COMMUNITY DEMAND | | • • | ٠ |
| CAMAD | - CUMMUNITY AWARENESS OF RIGHTS | | | |
| CAWAK | - COMMUNITY DEMAND VS PERCEIVED LEVEL OF | | | |
| CDM | | | | |
| 4.06 | SERVICE | | | |
| LOS | - LEVEL OF SERVICE - RECOGNIZED USEFULNESS BY COMMUNITY | | | |
| RUBC | - KECORNITED OZELOFINEZZ BI COMMONILI | | | |
| BOST K-TO | K*CLMND.K+(I-ID.K)*ADVS.K | 64. | A | |
| POST | - PRESSURE ON STAFF (MEDICAL AND ADMIN.) | - • | | |
| TO | - TEAM GUAL URIENTATIUN | | | |
| | - COMMONITY DEMAND | | | |
| AUVS | - ADVULACY SUPPORT | | | |
| WDA 2 | - ADVOCACT SOFFERT | | | |
| PPGST-K=SI | 100 TH(POST-K,PPST) | 65, | A | |
| PPS T= 3 | <u></u> | 65. | l, | С |
| PGFA=0 | | 65. | 2, | Ν |
| FCNA=0 | | 65.3 | З, | N |
| DD.191 | - PERCEIVED PRESSURE ON STAFF | | | |
| PUST | - PRESSURL UN STAFF (MEDICAL AND ADMIN.) | | | |
| PP31 | | | | |
| PUFA | | | | |
| PULA PLNA | - PRESSURE UN NURSE AUVUCATE | | | |
| LOIM | · ···································· | | | |

A MUDEL OF A HEALIH TEAM 4/24/73 PAGE 2 ARST. K=BCFK.K+FHUST.K+PPUST.K+TABLE(FPK,FINPR.K,-1, 06, A 1..51 06.1. T FPR=1/.5/.3/.2/.05 - NEGATIVE REACTION OF STAFF NRST - TUTAL NURMALIZED WORK AVAILABLE BURK FRUST - AVENAUE FRUSTRATION LEVEL OF STAFF PPOST - PERCEIVED PRESSURE UN STAFF - NEGATIVE REACTION VS FINANCIAL PRESSURE FPR NIMP.K=PPCST.K+AUJ2J*TABHL(NLM,LUS.K,J,1,0.2)* 67. A TABLE (IMP, FINPK.K,-1,1,3.2) 67.2. T NIM=1/J.9/U.7/C.5/U.3/U.1 IMP=1/1/1/1/.5/.5/.4/.3/.1/0/-.2 67.3. T - NEEDED IMPROVEMENT NIMP - PERCEIVED PRESSURE ON STAFF PPOST - NEED FUR IMPROVEMENT VS LEVEL OF SERVICE MIA - LEVEL UF SERVICE LUS - NEED FUR IMPROVEMENT VS FINANCIAL PRESSURE IMP NCIW.KL=(1-NWLRK.K)*NIMP.K*FUTUN+INWL.JK 68, R - RATE OF CHANGE IN WORK OF NURSE NCIM NWORK - LEVEL UF MURK PERFURMED BY NURSE - NEEDEU IMPRUVEMENT NIMP - FRACTION OF AUDITIONAL DUTIES TAKEN ON BY FDTGN NURSE - INCREASE IN WORK LEVEL OF NURSE INWL NWORK.K=NMORK.J+(DI)(NCIW.JK) 69, L NWORK - LEVEL OF WURK PERFORMED BY NURSE - RATE OF CHANGE IN WORK OF NURSE NCIN FCIm.KL=(1-FWCRK.K)*N1MP.K*FUTOF 70. R - RATE OF CHANGE OF WORK BY FHW FCIW FWORK - LEVEL OF WORK PERFORMED BY FHW - NEEDED IMPROVEMENT NIMP FDTOF - FRACTION OF ADDITIONAL DUTIES TAKEN ON BY DOCTUR 71. L FWORK .K=FWGRK .J+(DT)(FLLW.JK) FWORK - LEVEL OF WORK PERFORMED BY FHW - RATE OF CHANGE UP WORK BY FHW DCIW.KL=(1-DWCRK.K) +NIMP.K+FDTOD+DDWK.K 72. R - RATE OF CHANGE IN WORK OF DOCTOR DCIM - LEVEL UF HORK PERFORMED BY DUCTOR DWORK - NEEDED IMPROVEMENT NIMP - CHANGE IN DUCTOR'S WORKLOAD DUE TO NURSE DUWK 73. L DWORK .K = DWURK .J+(UT)(UCIW.JK) DWORK - LEVEL OF WORK PERFORMED BY COCTOR - RATE OF CHANGE IN WCRK OF DOCTOR DCIW 74. A WORK.K=(FWORK.K+DWORK.K+NWURK.K)/3 - TOTAL NORMALIZED WORK AVAILABLE HORK FWORK - LEVEL OF HURK PERFORMED BY FHW

DWORK - LEVEL OF WORK PERFORMED BY DOCTOR NWORK - LEVEL OF WORK PERFORMED BY NURSE

```
PAGE 3
            A MUDEL OF A HEALTH TEAM
                                      4/24/73
FCNA.K=PPN*NRST.K
                                                     75. A
    D.INA
          - PRESSURE UN NURSE ADVUCATE
           - PERCENT PRESSURE UN NURSE
    PPN
    NEST
           - NEGATIVE REACTION OF STAFF
PCFA.K=PPF*NRST.K
                                                     76. A
    POFA
           - PERCENT PRESSURE UN FHW
    PPF
           - PERCENT PRESSURE UN FHW
    NRST
           - NEGATIVE REALTION OF STAFF
FDAN.K=(PCNA.K*(1-PUNA.K)*4+UUN.K/LUS.K)/2
                                                     77. A
    FDAN
           - FRUSTRATIUM DUE TO PRESSURE EN NURSE
    PONA
           - PRESSURE UN NURSE ADVUCATE
           - CRIENTATION OF GUALS OF NURSE
    0 ⊌N
    LUS
           - LEVEL OF SERVICE
FDAF.K=1PCFA.K+(1-PUFA.K)+4+66FHW.K/LUS.K)/2
                                                     78, A
PFN=0.5
                                                     78.1. C
PPF=0.5
                                                     78.2. C
FUTCU=J.333
                                                     78.3. C
                                                     78.4. C
ACJ20=1
FOTOF = 0.323
                                                     78.5. C
CwRX≃.3
                                                     78.6, C
CAMAR=CWRX
                                                     78.7. N
FDTCN=J.333
                                                     78.8. C
           - FRUSTRALLUN DJE TO PRESSURE ON FHW
    FDAF
    PUFA
           - PERCENT PRESSURE UN FHW
    OGFHW
           - GUAL UKIENTATIUN UF FHW
           - LEVEL UP SERVICE
    LOS
    PPN
           - PERCENT PRESSURE UN NURSE
    PPF
           - PERCENT PRESSURE UN FHW
           - FRACTION OF ADDITIONAL DUTIES TAKEN ON BY
    FUTUE
               DUCTUR
    CWRX
           - INITIAL VALUE OF COMMUNITY AWARENESS
    CAMAR - CUMMUNITY AMARENESS OF RIGHTS
    FOTON - FRACTION OF AUDITIONAL DUTIES TAKEN ON BY
               NURSE
                    DUCTUR - CUMMUNITY SEGMENT
A=CATD+NEFF++EF+
                                                     79.6, N
B=RVD+0.5+RVN+0.5*KVF#
                                                     79.7, N
6LUA+(5/10.6+0.4+10/4)+A+106+3.0)+A=0J6
                                                     79.8. N
    DATE
           - LUCTUR'S ABILLITY TO DIAGNOSE
    NEFF
           - NUKSÉ EFFEUTIVENESS
           - FHM EFFECTIVENESS
    FEFF
           - RECUGNIZED VALUE OF DUCTOR
    KVD
           - RECOGNIZED VALUE OF NURSE
    KVN
           - KELUGNIZEU VALUE OF FHW
    RVFh
           - EFFECTIVE UPERATION OF COURSE OF TREATMENT
    EGI
    AUJ6
           - NURMALIZING FACTUR
                                                     80. A
TWPAT-K=TABHL (TWP, ENUKK-K, U, 2, U-4)
    IMPAL - TIME WITH PATIENT
           - NORMAL VALUE OF DUCTUR'S WORKEGAD
    ThP
    EWORK - PERCENTAGE EXTRA WORK
```

PAGE 4 A MUULL OF A HEALTH TEAM 4/24/73 EnCKK.K=NUMNU+LSmS1.K=(Unukk.K+NMT.K)/(SLMNU.K+ 81, A NLSmS#NEWOK1 TmP=U/J. 133/U. 000/1/1/1 olel, T NDWUR = UNURK+NMI 81.2. N CAMCS=CAMCA 81.3, N NLSWS=LSASI 81.4. N EMURK - PEKCENTAGE EXTRA MURK CAMUA - NURMAL VALUE OF SERVICE DEMAND LSWSI - LEVEL OF SERVICE WITHOUT STAFF IMPROVEMENT - LEVEL OF WORK PERFORMED BY LOCTOR CHURK NMT - LEVEL OF NURSE MEDICAL TREATMENT SCHNO - SERVICE DEMAND NLSWS - INITIAL VALUE OF SERVICE WITHOUT STAFF IMPRUVEMENT I AP - NURMAL VALUE OF DUCTUR'S WURKLOAD DKOP.K=ADJ4*(ADJ3*IAFAI.K*(DAIC.K+U.75)+FINF.K+ 02, A IINF.KI DKOP - LUCTUR'S KNUWLEDGE OF PATIENT - NURMALIZING FACTUR ADJ4 ADJ3 - NORMALIZING FACTOR TMPAT - TIME WITH PATIENT - DOCTOR'S ABILIYE TO COMMUNICATE WITH 214G PATIENTS FINE - FURMAL INFURMATION FLUW LINE - INFURMAL INFORMATION FLOW CATE.K=ADJ5*TnPAT.K*(1+UATC.K) 83. A DATU - DCCTUR'S ABILITY TO DIAGNOSE - NORMALIZING FACTUR ADJ5 - TIME WITH PATIENT IWPAT DATC - DOCTUR'S ABILLYT TO CUMMUNICATE WITH PATIENIS EATC.K=DATC.J+(UT)(KUATC.JK)(DATC.J)/TTCDC 84, L DATC - DECTUR'S ABILIYT TO COMMUNICATE WITH PATIENIS - RATE OF CHANGE OF DOCTOR'S ABILITY TO RDATC COMMUNICATE TTCDC - TIME TO CHANGE DOCTUR'S KNUMLEDGE OF COMMUNITY RCATC.KL=(1-DATC.K)(DKOC1.K*DKUP.K-TABLE(RUT. 85, R IMPAT-K.U.1.0.21) RDT=1/.8/.6/.4/.2/U 85.1. T TTCCC=26 85.2. C RDATC - KATE OF CHANGE OF DUCTUR'S ABILITY TO COMMUNICATE - CCCTUR'S ABILIYI TO COMMUNICATE WITH DATC PATLENIS - COCTOR'S KNOWLEDGE OF CUMMUNITY DKGCL - DOCTOR'S KNUWLEDGE OF PATIENT DKOP - RATE VS TIME WITH PATIENT RDT THPAT - TIME WITH PATIENT - TIME TO CHANGE DOCTOR'S KNOWLEDGE OF TICDC CUMMUNITY

PAGE 5 A MUDEL OF A HEALTH TEAM 4/24/73 EOT .K=(DATU .K +FEFF .K+NEFF .K) *UTLT .K *ADJ6 86 A - EFFECTIVE UPERATION OF COURSE OF TREATMENT DATD - DUCTUR'S ABILLITY TO DIAGNUSE FEFF - FHM EFFELLIVENESS NEFF - NURSE EFFECTIVENESS CICI - DESIRE TO CUNTINUE TREATMENT ADJ6 - NORMALIZING FALTUR PPET.K=({{RVD.K+J.5*RVN.K+J.5*RVFW.K}/2}+ 87. A SPCGTH(EGT.K, TUEL)1/2 - PATIENT'S PERCEPTION OF TREATMENT PPOT - RECOGNIZED VALUE OF DUCTOR KVD RVN - RECOGNIZED VALUE OF NURSE RVFW - RECUGNIZED VALUE OF FHM - EFFECTIVE OPERATION OF COURSE OF TREATMENT EOT TOEL - TREATMENT PERCEPTION DELAY OGD1.K=OGC.K 88. A OGD1 - URIENTATION OF GUALS OF DOCTOR OGO - CRIENTATION OF DOCTOR TO COMMUNITY DKOC.K=DKCC.J+(LT)(RDKUL.JK) 89. L - BOCTUR'S KNUWLEDGE OF CUMMUNITY - KATE OF CHANGE OF DUCTUR'S KNOWLEDGE OF RUKOC CUMMUNITY ROKUC.KL=(UGD1.K)(IINF.K+DATC.K-DKUC.K+PINF.K)(1-90. R DKOC.K)/TICCK ROKOC - RATE OF CHANGE UP DOCTUR'S KNOWLEDGE OF CUMMUNITY OGO 1 - CRIENTATION OF GUALS OF CUCTOR - INFURMAL INFURMATION FLOW LINE DATE - CUCTUR'S ABILIYT TO COMMUNICATE WITH PATIENTS DKCC - ECCIBR'S KNOWLEDGE OF COMMUNITY PINE - PRUVIDED INFURMATION TICOK - TIME TO CHANGE DUCTOR'S KNOWLEDGE PINF.K=STEP(QUANT, BEGIN) 91, A CUANT =0 91.1, C BEGIN=J 91.2. C TTCDK=52 91.3, C PINE - PRCVIDED INFORMATION - AMUUNT OF INFORMATION PROVIDED EXTERNAL TO QUANT SYSTEM - THE TIME THE INF. IS FIRST PRESENTED BEGIN TTCDK - TIME TO CHANGE DUCTOR'S KNUWLEDGE DKOC1.K=DKOC.K 92. A DKCC1 - LUCTUR'S KNUMLEUGE OF CUMMUNITY - LLCTUR'S KNUWLEDGE OF COMMUNITY

```
PAGE 6
            A MUDEL OF A HEALTH TEAM
                                        4/24/73
CGD.K=UGD.J+(LT)(UMSAT.J-DFKST.J)(TU.J)(UKUC.J)(1- 93, L
  GGD-J)(CGD-J)/IICG
TTCG=52
                                                     93.2. C
    CGD
           - UNIENTATION OF LUCTUR TO COMMUNITY
    UMSAT
           - LUCTUR SATISFACTION
          - LUCTUR'S FRUSTRATIUN
    DERST
    TU
           - TEAM GUAL URIENTATION
           - CCCTUR'S KNUWLEDGE OF COMMUNITY
    DKOC
          - TIME TO CHANGE DUCTUR'S GUALS
    TTCG
VO.K=DATC.K*ImPAT.K/EImP
                                                     94, A
    VD
           - VALUE OF DUCTOR
    DATC
           - LUCTUR'S ABILLYT TO COMMUNICATE WITH
               PATTENTS
    TAPAT
           - TIME WITH PATIENT
    ETHP
           - EXPECTED TIME WITH PATIENT
RVD.K=SMOCTH(VU.K,UKU)
                                                    95, A
           - RECOGNIZED VALUE OF DOCTOR
    RVD
    VD
           - VALUE OF DUCTOR
    DRD
           - DELAY IN WEEKS OF RECOGNITION OF DOCTOR
DICT.K=TABLELICT, PPUT.K, U.1, U.2)
                                                     96, A
TCT=.25/.40/.55/.70/.05/1
                                                     96.1, T
    DICT
          - LESIRE TO CUNTINUE TREATMENT
           - DESIRE TO CONTINUE VS PATIENTS' PERCEPTION
    TCT
    TONG
           - PATIENT'S PERCEPTION OF TREATMENT
STR.K=TABFL(E0,E0T.K,J,1,J.1)
                                                     97, A
EQ=0.4/0.4/0.4/0.4/J.4/J.4/J.55/J.7/O.85/Q.95/1
                                                    97.1. T
    STR
          - SUCCESSFUL TREATMENT RATE
    EO
           - SUCCESSFUL TREATMENT RATE VS EOT
   EOT
          - EFFECTIVE OPERATION OF COURSE OF TREATMENT
SFPC.K=TABHL(PT.TWPAT.K.U.1.0.2)
                                                    98. A
PT=0/0/.33/.66/.99/1.0
                                                    98.1. T
    SFPC
          - SATISFACTION FROM PATIENT COMMUNICATION
           - PATIENT COMMUNICATION VS TIME WITH PATIENT
    PΤ
    TWPAT - TIME WITH PATIENT
PSTR.K=SMCOTH(STR.K,PTUEL)
                                                    99, A
    PSTR - PERCEIVED SUCCESSFUL TREATMENT RATE
           - SUCCESSFUL TREATMENT RATE
    STR
FDPTR.K=TABLE(PST.PSTR.K.O.1.0.1)
                                                    100, A
PST=1/1/1/1/1/0.9/0.5/0.25/0.1/0
                                                    100.1. T
    FUPTR - FRUSTRALIUN DUE TO POOR TREATMENT RATE
           - PERCEIVED SUCCESSFUL TREATMENT RATE
    PSTR
EMSAT K= (SFPC K+UGD K+PPPUT K)/2
                                                    101. A
    DMSAT - DCCTUR SATISFACTION
           - SATISFACTION FROM PATIENT COMMUNICATION
    SEPC
    CGD
           - GRIENTATION OF DUCTOR TO COMMUNITY
    PPPGT - PERCEIVED PATIENTS PERCEPTION OF TREATMENT
```

PAGE 7 A MODEL OF A HEALTH TEAM 4/24/73 SCOMP.K=TABHL(DM,DMSAT.K,U,1,U.1) 102. A SCUMP - EUCTUR SATISFACTION COMPENSATION FUNCTION - SATISFACTION COMPENSATION VS SATISFACTION D.M. DMSAT - UCLTUR SATISFALTION DFRST.K=SCCMP.K*(NRST.K+UFDAC.K+FDPTR.K)/3 103. A DM=1/1/1/1/0.9/J.8/J.7/J.6/U.5/J.4/J.3 103.1. T DFRST - LCCTUR'S FRUSTRATIUN SCOMP - LOCTOR SATISFACTION COMPENSATION FUNCTION NRST - NEGATIVE REACTION OF STAFF DEDAC - CECTOR PROSTRATION DUE TO ACMIN. CONTRUL FDPTR - FRUSTRATIUM DUE TU PUOK TREATMENT RATE DM - SATISFACTION COMPENSATION VS SATISFACTION PPPOT.K=SMOUTH(PPUT.K,UPUEL) 104. A PPPCT - PERCEIVED PAILENTS PERCEPTION OF TREATMENT - PATIENT'S PERCEPTION OF TREATMENT DPDEL - DELAY TIME FOR PERCEPTION OF PATIENTS ATTITUDE TO TREATMENT FINE.K=FIN 105. A FINE - FORMAL INFURMATION FLOW IIRF.K=(DICN.K+LTLF.K)/2 106, A DWORK = DWRKX+ (1-CAMAN) *PNEUW*NMT 106.1. N DWRKX=0.8 106.2. C DRD=3 106.3, C CELSE=5 106.4. C CATC=DATCX 106.5. N CATCX=0.3 106.t. C DKCC=OKCCX 106.7. N DKOCX=.2 106.8. C PTDEL=2 106.9, C LINE - INFURMAL INFURMATION FLOW DTCN - NUKSE'S DESIRE TO COMMUNICATE DTCF - DESIRE TO COMMUNICATE BY FHW DWORK - LEVEL OF WORK PERFORMED BY DOCTOR DWRKX - INITIAL VALUE OF DOCTUR'S WORKEGAD CAMAN - CUMMUNITY AWARENESS OF MEDICAL ABILITY OF NUKSE PNEDW - PERCENT NURSE WURK EQUIVALENT TO DOCTOR'S NMT - LEVEL OF NURSE MEDICAL TREATMENT DRD - CELAY IN WEEKS OF RECOGNITION OF DECTOR DELSE - LELAY IN STAFF ESTIMATION - LUCTUR'S AGIETYT TO COMMUNICATE DATC PATIENTS DATCX - INITIAL VALUE OF DECIUR'S ABILITY TO CUMMUNICATE DKOC - CCLIGR'S KNUWLEDGE OF COMMUNITY DRUCK - INITIAL VALUE OF DUCTOR'S KNOWLEDGE OF CUMMUNITY

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PAGE 8
           A MUDEL OF A HEALTH TEAM
                                       4/24/73
CCC=CGDX
                                                     107, N
0GDX=0.2
                                                     107.1. L
FIN=0.5
                                                     137.2. C
ETHP=1
                                                     107.3. C
IDEL=2
                                                     107.4. C
ACJ5=3.5
                                                     107.5. C
3 د د ۵ - DJ4 = 0
                                                     107.6. C
ACJ3=0.5/14
                                                     107.7, C
ACJ6=0.333
                                                     107.8, C
           - CRIENTATION OF DUCTOR TO CUMMUNITY
   OGU
   OGDX
           - INITIAL VALUE OF DUCTOR'S GOAL GRIENTATION
   ETWP
           - EXPECTED TIME WITH PATIENT
   TDEL
           - TREATMENT PERCEPTION DELAY
   ADJ5
           - NORMALIZING FACTUR
   ADJ4
           - NORMALIZING FACTOR
          - NORMALIZING FACTUR
    ADJ 3
   ADJA
         - NORMALIZING FACTUR
                  FAMILY HEALTH WORKER SEGMENT
SLF.K=(SMCOTH(FEFF.K, DELSE)+TO.K*RVFW.K)/ADJS6
                                                    109. A
           - STAFF ESTIMATION OF PERFORMANCE OF FHW
   SLF
   FEFF
           - FHW EFFECTIVENESS
           - LELAY IN STAFF ESTIMATION
    DELSE
           - TEAM GOAL JRIENTATION
    IO
   RVFW
           - RECUGNIZED VALUE OF FHW
    ADJS6 - NURMALIZING FACTOR
LSC.K=(FEFF.K+RVFW.K+UGFHW.K+ADJSC+SMOUTH(LCA.K.
                                                     110. A
  DELC))/3
           - LEVEL OF SELF-COMPETENCE
   LSC
   FEFF
           - FHW EFFECTIVENESS
           - RECOGNIZED VALUE OF FHW
   RVFn
   OGFHW - GOAL URIENIATION OF FHW
   ADJSC
           - NORMALIZING FACTUR
           - LEVEL OF CUMMUNICATION ACCEPTED
   LCA
    DELC
           - CELAY IN LEVEL COMMUNICATEL (PERCEIVED)
ACI.X=ADACI+TU.K+SLF.K+(1-FRUST.K)
                                                     111. A
           - ACCEPTANCE OF COMMUNICATED INFORMATION
    ACI
           - ADJUSTMENT FACTOR ACI
    ADACI
    TO
           - TEAM GUAL URIENTATION
   SLF
           - STAFF ESTIMATION OF PERFORMANCE OF FHW
    FRUST - AVERAGE FRUSTRATION LEVEL OF STAFF
                                                    112, A
LCA.K=ACI.K*DTCF.K
          - LEVEL UF CUMMUNICATION ACCEPTED
   LCA
           - ACCEPTANCE OF COMMUNICATED INFORMATION
    ACI
           - DESIRE TO COMMUNICATE BY FHW
    DTCF
LSK.K=LS
                                                    113. A
   LSK - INITIAL LEVEL OF FHW SKILLS
```

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PAGE 9
            A MUDEL OF A HEALTH TEAM 4/24/73
ATE.X=ADJ7#RUBL.K#LSK.K
                                                      114. A
    ATE
          - ABILITY TO EDUCATE
           - NCRMALIZING FACTOR
    ADJ7
    RUBC
           - KECOGNIZED USEFULNESS BY COMMUNITY
           - INITIAL LEVEL OF FHW SKILLS
    LSK
TO.K=LOGFFm.K+UGD.K+UGN.K]/3
                                                      115. A
    TO
          - TEAM GUAL UKIENTATIUN
    OGFHW - GOAL URIENTATION OF FHW
    CGD
           - CRIENTATION OF DUCTUR TO COMMUNITY
    OGN
           - CRIENTATION OF GUALS OF NURSE
PLSC.K=DELAYI(LSC.K.DSCF)
                                                      116. A
    PLSC - PERCEIVED LEVEL OF SELF-COMPETENCE BY FHW
    LSC
           - LEVEL UF SELF-COMPETENCE
FEFF.K=LSK.K*(1-FFKST.K)*TABHL(Fm,FWORK.K,0,1.2,
                                                      117, A
  0.1)
FW=1/1/1/1/1/1/1/095/09/08/05/04/035
                                                      117.1, T
    FEFF - FHW EFFECTIVENESS
    LSK
           - INITIAL LEVEL OF FHW SKILLS
    FFRST - FHM FRUSTRATIUN
    FW - EFFECT IVENESS VS WURK LOAD
FWORK - LEVEL OF WURK PERFERMED BY FHW
GOP.K=GCP.J+(CT)(ATE.J+(TC.J-GOP.J))(1-GOP.J)*
                                                      118. 1
  GOP.J/TICCG
TTCCG=52
                                                      118.1. C
    GOP
           - GUALS OF PUPULATION
    ATE
           - ABILITY TO EDUCATE
           - TEAM GUAL JRIENTATION
    TO
    TICCG - RATE OF CHANGE OF GOALS OF POPULATION
INTER.K=(MAX(GOP.K*FKUE.K*KVFm.K-OGFHm.K,OGFHm.K-
                                                    119, A
  GOP.K*FKUC.K*KVFW.KJ+MAX(IU.K-CGFHW.K,OGFHW.K-
  TO.K))(FFDAC.K+FUAF.K+FUIFF.K+FFDRC.K)
    INTER - INTERMEDIATE VARIABLE
           - GOALS OF PUPULATION
    GOP
    FKUC
           - FHW KNOWLEUGE OF COMMUNITY
    KVFW
           - KEGGGNIZED VALUE OF FHW
    OGFHW - GOAL ORIENTATION OF FHW
    TO
           - TEAM GUAL ORIENTATION
    FFDAC - FHW FRUSTRATIUN DUE TO AUMINISTRATIVE
               CONT KUL
    FDAF
           - FRUSTRAILUN DUE TO PRESSURE ON FHW
    FDIFF - DIFFERENCE BETWEEN PERCEPTIONS
    FFDRC - FHW FRUSTRATION DUE TO RESPONSE OF
               COMMUNITY
FFDRC .K = TABLE (DRC , RVF W . K , U , 1 , 0 . 2 ) * UGFHW . K
                                                     120. A
ERC=1/1/J.7/J.4/J.1/
                                                     120.1, T
    FFORC - FHW FRUSTRATION DUE TO RESPONSE OF
               CUMMUNITY
           - FRUSTRATIUN VS RECUGNIZED VALUE
    DRC
           - RECUGNIZEU VALUE OF FHW
    RVF#
    OGFHW - GOAL UKIENTATION OF FHW
```

A MUDEL OF A HEALTH TEAM 4/24/73 PAGE 10 121, A FFRST.K=TABHL(FRT,INTER.K,U,Z,U.Z) 121.1, T FRT=J/.2/.4/.5/.58/.66/./1/.78/.8c/.94/1 FFRST - FHE FRUSTRATION INTER - INTERMEDIATE VARIABLE OGFHW.K=OGFHW.J+(DT)(KCJGF.JK)*LGFHW.J 122, L OGFH# - GOAL UNIENTATION OF FH# RCCGF - HATE OF CHANGE OF GOAL URIENTATION RCUGF.KL = (FKUC.K+(TU.K-UGFHW.K)(1-KVFW.K))(TU.K)(1- 123, K CGFH#.K]/AUJ21 ROUGE - KATE UF CHANGE OF GUAL ORIENTATION - FAM KNOWLEDGE OF COMMUNITY FKOC - TEAM GUAL UKIENTATIUN Tα OGFHW - GUAL URIENTATION OF FHW - RECOUNTLED VALUE OF FHW RVFW RFKCC.KL=(RII.K-KLII)(1-FKUC.K)(FKUC.K)/ITCKF 124. R REKOC - RATE OF CHANGE OF FHW KNOWLEDGE CF CUMMUNITY - HATE UF INFURMATION THANSFER RIT - FHM KNUMLEDGE OF COMMUNITY FKUC TICKE - TIME TO CHANGE KNOWLEDGE OF COMMUNITY FKCC.K=FKCC.J+(UT)(KFKUC.JK) 125. L 125.1, C TTCKF=52 - FHM KNUWLEUGE OF COMMUNITY FKOC REKOC - KATE OF CHANGE OF FHW KNOWLEDGE OF CUMMUNITY TICKE - TIME TO CHANGE KNUWLEDGE OF COMMUNITY RVFW.K=RVFW.J+(CT)(fCIK.JK)(1-RVFW.J)*RVFW.J 126. L RVFW - RECUGNIZED VALUE OF FHW - RATE OF CHANGE OF RECOGNIZED VALUE FCIR 127. A RIT.K=(RVFW.K+2.U+RUBL.K)/3 - RATE OF INFURMATION TRANSFER RIT - RECOGNIZED VALUE OF FHW RVFW - KECOGNIZED USEFULNESS BY COMMUNITY RUBC FDIFF.K=MAX(PLSC.K-SPL.K.SPL.K-PLSC.K) 128, A FDIFF - CIFFERENCE BETWEEN PERCEPTIONS PLSC - PERCEIVED LEVEL OF SELF-COMPETENCE BY FHW FCIR.KL=GOP.K+FEFF.K+UGHHW.K-TABLE(FCI,CDMND.K,0,1, 129, R 0.21 129.1. T FCI=.1/.1/.1/.2/.6/1 FCIR - MATE OF CHANGE OF RECOGNIZED VALUE

GOP

FEFF

FCI

- GOALS OF PUPULATION - FHW EFFECTIVENESS

- RATE UF CHANGE VS COMMUNITY DEMAND

OGFHW - GOAL ORIENTATION OF FHW

COMNO - COMMUNITY DEMAND

PAGE II A MUNEL OF A HEALTH TEAM 4//4/73 CTCF.K=OTCF.J+(UT)(PLSC.J)(LCA.J)(1-FFKST.J)(1-130. L DTCF.J) *DTCF.J DICE - DESIRE IL COMMUNICATE BY FHW PLSC - PERCEIVED LEVEL OF SELF-COMPETENCE BY FHW I CA - LEVEL UF CUMMUNICATION ACCEPTED FFRST - FHW FRUSTKATIUN SPL.K=SMCCTH(SLF.K.DELSP) 131. A ADJ21=52 131.1. C ACJ7=1 131.2. C DELC=8 131.3. C ACJS6=1.0 131.4. C OSCF=8 131.5. C DEL SP=4 131.6. C CTCF=0.2 131.7. N 131.8, N FKOC=FKGCX FKCCX=.8 131.9. C - STAFF ESTIMATION OF PERFORMANCE OF FHW SLF - DELAY IN PERLEPTION **DEL SP** - NURMALIZING FACTOR ADJ7 DELC - DELAY IN LEVEL COMMUNICATED (PERCEIVED) ADJ S6 - NORMALIZING FACTOR DICE - DESIRE TO COMMUNICATE BY FHM - FHW KNUWLEDGE OF LCMMUNITY FKOC. FKOCK - INITIAL VALUE OF THE KNOWLEDGE OF COMMUNITY RVF = 0.5 132. N ACACI = 1 132.1. C GGFHW=DGFHX 132.2. N OGFHX=0.8 132.3. C LS=0.5 132.4, C GOP=GOP X 132.5. N GOPX=0.4 132. £. C FHORK=FHRKX 132.7. N FWRKX=0.7 132.8, C FDIFF=0 132.9. N RVFW - RECOGNIZED VALUE OF FHW - ADJUSTMENT FACTUR ACL ADACI - GUAL DRIENTATION OF FHW OGEHW - INITIAL VALUE OF FHW GOAL ORIENTATION OGFHX - GOALS OF PUPULATION GOP GOPX - INITIAL VALUE OF GOAL ORIENTATION OF COMMUNITY FWORK - LEVEL UF WURK PERFORMED BY FHW FWRKX - INITIAL VALUE OF FHW WURK LLAD FOIFF - CIFFERENCE BETWEEN PERCEPTIONS FINANCIAL - ADMINISTRATIVE SEGMENT FINR.K=FINP.K/UPCST.K 134. A FINR - FINANCIAL KATIÚ - FINANCIAL PUSITIUN FINP

OPCST - LPERATING COST LF CENTER

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PAGE 12
            A MUUEL OF A HEALTH TEAM 4/24/13
GPCST.K=QVRHU+VALST.K#SUMNU.K
                                                     135. A
    CPCST - CPERATING LOST OF CENTER
    DYRHU - UVERHEAD CUSTS OF CENTER
    VACST - VARIABLE CUST/PATIENT
    SUMNU - SERVICE DEMAND
FINPR.K=TABHL(FNP,FINK.K,-U.1,U.1,U.U2)
                                                     136, A
FNP=-1/-.7/5/-.55/-.525/-.1/U/.1/.2/.46666/.7332/1
                                                     136.1. T
E BC A= 1
                                                     136.2, C
FEE=7
                                                     136.3. C
CVRED=J
                                                     136.4, C
                                                     136.5. N
INTSL=LS#SI
NSERV=865
                                                     136.6. C
                                                     136.7. C
F01=13
FUND=80G0C0
                                                     136.8, C
NCPYN=2.2
                                                     136.9. C
   FNP
           - FINANCIAL PRESSURE VS FINANCIAL RATIO
   FINR
           - FINANCIAL RATIO
    E BOA
           - ECUNUMIC BASE OF AREA(THOSE WHO CANNOT PAY)
           - AVERAGE PAYMENT UF THUSE WHO CAN PAY
    FEE
    UVRHD - GVERHEAD CUSTS OF CENTER
           - INITIAL SERVICE LEVEL
- LEVEL OF SERVICE WITHOUT STAFF IMPROVEMENT
    INTSL
    LSWSI
          - NUMBER SERVED PER GIVEN SERVICE LEVEL
    NSERV
           - RATE OF INCREASE
    ROI
           - DOLLARS PER YEAR
    FUND
    NCPYN - CONTACTS PER YEAR PER PERSON
                                                     137, C
NUM=20300
                                                     137.1, C
CPLSP=18
                                                     137.2. N
FINP=0
           - PERSUNS
    NUM
    CPLSP - LOST PER LEVEL OF SERVICE PER PERSON
           - FINANCIAL PUSITION
    FINP
NUMBR.K=NUM
                                                     138, A
    NUMBR - NUMBER OF PEOPLE IN SERVICE AREA
           - PERSUNS
    NUM
                                                     139, A
SDMND.K=NCPWN.K+(NUMBR.K-LFINA.K)+DTCT.K/DTCTN
DICTN=DICT
                                                     139.1. N
                                                     139.2. N
SDMND=NCPhN+(NUMBK-LF1NA)
    SOMNO - SERVICE DEMAND
    NCPWN - CONTACTS PER WEEK PER PERSONINCREASE IN
               FUNDING
          - NUMBER OF PEOPLE IN SERVICE AREA
    NUMBR
    LFINA - NUMBER LUST OF FINANCIALLY ABLE
    DTCT
           - CESIRE TO CONTINUE TREATMENT
                                                     140, A
NCPhN.K=NCPYN/52
    NCPWN - CONTACTS PER WEEK PER PERSONINGREASE IN
               FUNDING
    NCPYN - CONTACTS PER YEAR PER PERSON
                                                    .141, A
FUNDS.K=(FUND+XX.K)/52
   FUNDS - LEVEL OF OUTSIDE FUNDING
           - DOLLARS PER YEAR
    FUND
```

PAGE 13 A MUUEL UF A HEALTH TEAM 4/24/73

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AZ-K=STEP (INCH.GRANT)
                                                     142, A
 GRANT-500
                                                     142.1, C
 INCR=0
                                                     142.2. C
    INCR
            - AMOUNT
    GRANT - TIME UF GRANT
 CSDMD.K=SMUOTHISOMNU.K.11
                                                     143. A
    CSDMD - PREVIOUS SERVICE DEMAND
     SOMNO - SERVILE UEMANU
 CSDMD.K=(SDMNE.K-DSDMD.K)/USDMD.K
                                                     144, A
    CSUMU - CHANGE IN SERVICE DEMANDIPERCENT)
    SOMNU - SERVILE DEMAND
    CSOMO - PREVIOUS SERVILE DEMANU
 ADPRU-K=AEP
                                                     145, A
ADP=0.5
                                                     145.1, C
    ADPRB - LEVEL UF AUMIN. PRUBLEMS
FINP-K=FINP-J+(DT)((1-LUUA)(1-PLUST-J)#FEE+FUNDS-J- 146, L
  CPCSI.J)
LCS=LSWSI
                                                     146.1. N
DPS=52
                                                     146.2. C
    FINP
           - FINANCIAL POSITION
    ÉBOA
           - ECONUMIC BASE OF AREALTHUSE WHO CARNOT PAY)
    PLUST - PERCENT UP FINANCIALLY ABLE WHO HAVE BEEN
               LUST
           - AVERAGE PAYMENT OF THUSE WHO CAN PAY
    FUNDS - LEVEL OF OUTSIDE FUNDING
    UPCST - UPERATING CUST OF CENTER
           - LEVEL OF SERVICE
    LOS
    LSWSI - LEVEL OF SERVICE MITHOUT STAFF IMPROVEMENT
           - TIME TO PERCEIVE CHANGE
    UPS
PLCS.K=SMCOTH(LLS.K.UPS)
                                                    147. A .
    LUS - LEVEL UF SERVICE
    OPS
           - TIME TO PERCEIVE CHANGE
PLOST-K=TABHL(PLoPLUS-K, J, 1, J. 1)
                                                    148. A
PL=1/1/1/C.9/U.7/U.5/U.25/U.15/U.1/U.U5/U
                                                    146.1. T
    PLUST - PERCENT OF FINANCIALLY ABLE WHO HAVE BEEN
               LUST
FFFF.Kalufrsi.K+NFRSI.K+FFRSI.K1/3
                                                    149. A
FFF=1
                                                    149.1. C
FRUST=0.5
                                                    149.2. N
    DERST - ELLIUR®S FRUSTRATIUN
    NFRST - NURSE FRUSTRATION
    FFRST - THE FRUSTRATIUN
    FRUST - AVERAGE FRUSTRATION LEVEL OF STAFF
FRUST . K = SPUD TH (FFFF . K , FFF }
                                                   150. A
    FRUST - AVERAGE FRUSTRATION LEVEL OF STAFF
```

| PAGE 14 | A HODEL OF A HEALTH TEAM OF THE | |
|-------------------|---|---------|
| | 1. O. Lin Asport . I. w | 151. A |
| | L.O-EBUAI*PLUSI.K | |
| LFINA | - NUPBER EUST OF FINANCIALLY ABLE | DAVI |
| EBUA | - LCUNUALL DASE OF AREALTHUSE MID CANNUT | LLK |
| PLUST | - PERCENT OF FRANCIALLY ADEL AHO HAVE B | CEN |
| | LUST | |
| 0 = 2 2 D × 4 | COTC MA LOS MALLAMON MAA | 152. A |
| | CPTC.K+AUVS.KI(LUMNU.K)/Z | . , , , |
| PICOP | - PRESSURL IJ CHANGE UPERATION | |
| DPTC | - LCUIUMS PRESSURE TO CHANGE | |
| ADVS | | |
| เกษเก | - CUMMUNITY DEMAND | |
| COICA 4-5 | POOTH(PTCUP.K.PUEL.K) | 153. A |
| LPICA.Nº3 | - DELAYED PRESSURE TO CHANGE ADMIN | |
| UPICA | - PRESSURE TU CHANGE OPERATION | |
| | - PERCEPTION DELAY | |
| PUEL | - PERCEPTION DELAT | |
| DOTC K=1N | RST.K+1)*UUU.K/(2*(1+LCS.K)) | 154. A |
| CALC | - BOLTURS PRESSURE TO CHANGE | |
| MACT | - NEGATIVE REACTION OF STAFF | |
| 000 | - ORIGINAL OF OUCLOR TO COMMUNITY | |
| 1.05 | - DRIENTATION OF DUCTOR TO COMMUNITY - LEVEL OF SERVICE | |
| LUJ | - Etyte or denvioe | |
| POFL KENP | C+(L+AFRST .K) | 155, A |
| POEL | - PERCEPTION DELAY | |
| NPD | - ACRMAL PERCEPTION DELAY | |
| AFRST | - AUMIN. FRUSTRATION LEVEL | |
| | | |
| PFRST.K=S | MOUTH(FRUST-K.AUMAH.K) | 156, A |
| PFRST | - PERCEIVEU STAFF FRUSTRATION BY ADMIN. | |
| FRUST | - AVERAGE PROSTRATION LEVEL OF STAFF | |
| ADMA: | - ADMIN. AWAKENESS DELAY | |
| | | |
| | AFRST JOUT # HAFK. JK | 157, L |
| AFRST | - ACMIN. FRUSTRATIUN LEVEL | |
| RAFR | - HATE OF CHANGE OF ADMIN. FRUSTRATION | |
| | | 158. A |
| | NAWAAAAA | 1701 W |
| ADMA | - AUMIN. AWARENESS WELAY | |
| NAW | - NORMAL AWAKENESS | |
| AFRS | r - ACMIN. FRUSTRATIUN LEVEL | - |
| I CHC I Mad | Sms1.J+(DT)((PTCBS.J/ROI)-CSDMD.J) | 159. L |
| L 2 M 2 L - W - L | | |
| C 20 3 | - PRESSURE TO CHANGE BASIC LEVEL OF SERV | /1CES |
| | - RATE UF INCHEASE | |
| RCI | - CHANGE IN SERVICE DEMAND(PERCENT) | |
| CSUMI | A AINMINE SIE REILAINE ABILINIA I. C. ACILLA | |
| ASC - K=AS | C.J+(DT)(CHORK.JK) | 160, L |
| ASC=0 | | 160.1. |
| ASC | - ADDITIONAL SERVICE CAPACITY | - |
| € 70 Bi | K - RATE OF CHANGE OF TEAM WORK LOAD | |
| CHUR | in the first of the second of | |

Chark.KL=(OCIh.JK+FcIm.JK+NcIm.JK)/> 161. R CWORK - RATE OF CHANGE OF TEAM WORK LUAD OCLE - RATE OF CHANGE IN WORK OF BOCTOR - KATE UF CHANGE OF WORK BY FHW - RATE OF CHANGE IN WORK OF NORSE FCIE NC.I W VACST.K=CPLSP+LSnSI.K 162. A VACST - VAKIABLE CUST/PAITENT CPLSP - LUST PER LEVEL OF SERVICE PER PERSON LSWSI - LEVEL OF SERVICE WITHOUT STAFF IMPROVEMENT LOS.K=LSWSI.K+NoLKV+INTSL+ASC.K/(LSWSI.K+SDMNC.K) 163. A LUS - LEVEL OF SERVICE - LEVEL OF SERVICE WITHOUT STAFF IMPROVEMENT LSWSI - NUMBER SERVED PER GIVEN SERVICE LEVEL NSERV - INITIAL SERVICE LEVEL INTSL - ADDITIONAL SERVICE CAPACITY A SC SDMND - SERVICE DEMAND RUBC.K=(RVD.K+KVN.K+KVFm.K)/3.0 164. A RUBC - RECUGNIZED USEFULNESS BY COMMUNITY RVD - RECOGNIZED VALUE OF DOCTOR - RELUGNIZED VALUE OF NURSE RVN RVFL - RECUGNIZED VALUE OF FHW PTCBS.K=ACPRB.K*(CLIP(DPTCA.K, O, FINPK.K, O)+CLIP(O, 165, A (1-DPTCA.K), FINPR.K.O)+1)*0.5*FINR.K*CLIP(1. VAL.K, FINR.K, C) *CLIP(VAL2.K, 1, FINK.K, O) - PRESSURE TO CHANGE BASIC LEVEL OF SERVICES PTCBS ADPRB - LEVEL UF AUMIN. PRUBLEMS CPTCA - BELAYED PRESSURE TO CHANGE ADMIN - FINANCIAL RATIO FINR YAL.K=[ABFL(LIM,LUS.K,U,1,U.2) 166, A LIM=C/0/C.3/0.9/0.95/1 166.1. T - LEVEL UF SERVICE LOS VAL2.K=TABHL(L1M2,LU5.K,0,2,0.2) 167, A 167.1, T LIM2=1/1/1/1/1/1/.95/.9J/.5/.3/J LCS - LEVEL UF SERVICE RAFR.KL=(EPTCA.K+PFKST.K-EXLC.K) *TABLE(NPK.F1NPR.K. 166, K -1.1.0.2) * PCIF*(1-AFK5T.K) (AFRST.K) PC1F= J. 35 168.2. C RAFR - RATE OF CHANGE OF ADMIN. FRUSTRATION DPICA - DELAYED PRESSURE TO CHANGE ADMIN PFRST - PERCEIVED STAFF FRUSTRATION BY ACMIN. EXLC - EXPECTED LEVEL OF COMMUNITY DEMAND AFRST - ACMIN. FRUSTRATIUM LEVEL

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PAGE 16 A MUUEL UF A HEALTH TEAM 4/24/13 EXLC.K=SMCUTH((UPTLA.K+PFKST.K-NURML).SML)+NORMC 104. A SM0=52 169.1. C NERMC = DPTCA+PFKST 169.2. N NPR=-3/-34/-36/-44/-40/-5/-1/-9/1/1/1 169.3. 1 FF=C/C/U/C.2/U.5/1.3 169.4. I EXEC - EXPECTED LEVEL OF COMMUNITY DEMAND UPTCA - LELAYEU PRESSURE TO CHANGE ADMIN PERST - PERCEIVED STAFF FRUSTRATION BY ACMIN. NCRMC - INITIAL VALUE OF EXPECTED FRUSTRATION FFCAC.K=TABLE(FF.AFKS[.K.J.1.U.2] 170. A FEDAC - END EXUSTRATION DUE TO ADMINISTRATIVE LUNTKUL AFRST - ACMIN. FRUSTRATIUN LEVEL NFDAC.K=TABLE(DF,AFRS1.K,U,1,U.2) 171. A QF=J/J/J.2/J.4/J.8/1.J 171.1. T NFDAC - NURSE FRUSTRATION DUE TO ADMIN. CONTROL AFRST - AUMIN. FRUSTRATIUN LEVEL DFCAC.K=TABLE (DF.AFKST.K.J.1.J.2) 172, A NAW=4 172.1, C AFRST=0.2 172.2. N LSmSI=1 172.3. N DEDAC - DOCTUR FRUSTRATION DUE TO ADMIN. CONTROL AFRST - ADMIN. FRUSTRATIUN LEVEL NAH - NUKMAL AWAKENESS - LEVEL OF SERVICE WITHOUT STAFF IMPROVEMENT LSWSI NURSE SEGMENT NSDI.K=NDIMD.K+(NMI.K-CAMAN.K) 174, A NSDT - SATISFYING RESPUNSE NOTHO - NURSE'S DESIRE TO TAKE OVER DUTIES NMT - LEVEL UF NURSE MEDICAL TREATMENT CAMAN - CUMMUNITY AWAKENESS OF MEDICAL ABILITY OF NURSE NSDTP.K=SMOOTH(NSDT.K.NSDEL) 175. A NSDEL=10 175.1, C NSAT= (RVN+OGN+1.0)/2 175.2. N NSDTP - NURSE SATISFACTION DUE TO PERCEPTION OF COMMUNITY RESPONSE NSDT - SATISFYING KESPONSE - DELAY IN PERCEIVING RESPONSE NSDEL NSAT - NURSE SATISFACTION RVN - RECOGNIZED VALUE OF NURSE OGN - ORIENTATION OF GUALS OF NURSE NS.K=TABLE(N, NSUTP.K,-1,+1,0.2) 176. A N=1/1/1/1/1/1/0.75/J.5/0.25/U 176.1, T - ACTUAL SATISFACTION DUE TO COMMUNITY NS NSDTP - NURSE SATISFACTION DUE TO PERCEPTION OF COMMUNITY RESPUNSE

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ASCCM_K=TABHL (NC.NSAF.K.J.1.J.2) 177, A ASCUM - NURSE SAILSFACTION CUMPENSATION FUNCTION - CUMPENSATION VS LEVEL UF SATISFACTION NC - NUKSE SATISFACTION **NSAT** 178, A NSAT.K=(NS.K+KVN.K*UGN.K)/2 178.1, T NC=1/1/1/C.833/U.666/U.5 - NURSE SATISFACTION NSAT - ACTUAL SATISFACTION DUE TO COMMUNITY NS - RECOGNIZED VALUE OF NURSE KVN - CKIENTATION OF GUALS OF NURSE CUN - COMPENSATION VS LEVEL OF SATISFACTION NC 179. A NINT.K=((NFDAC.K+FDAN.K)/2)*NSCUM.K - INTERMEDIATE VARIABLE NEDAC - NURSE ERUSTRATION DUE TO ADMIN. CONTROL - FRUSTRATIUM DUE TO PRESSURE ON NURSE FLAN NSCOM - NURSE SATISFACTION COMPENSATION FUNCTION 180. A NFRST.K=TABLE (NF.NINI.K.J.).U.1) NF=C/C.05/U.1/C.233/U.366/J.5/J.62/J.74/C.86/C.95/ 180.1, 1 1.0 NFRST - NURSE FRUSIKATIUN - FRUSTRATIUM VS INTERMEDIATE VARIABLE NF - INTERMEDIATE VARIABLE NINT 181. A DCAMT.K=(C[NK.K+UGL.K*UmUKK.K]/2 DDNMT - DECTUR'S DESIRE FOR NURSE MEDICAL TREATMENT - LESIKE TU INCREASE NURSE KESPONSIBILITY DINR - URIENTATION OF DUCTOR TO COMMUNITY ngo DWURK - LEVEL OF WURK PERFURMED BY DOCTOR 182. A UPNIC.K=ShITCH(DUNMI.K,U,SWIL) DPNTC - LLLTUR'S PRAISE OF NURSE TO COMMUNITY DONMT - LECTUR'S DESIRE FOR NURSE MEDICAL TREATMENT MUNK - C IF DUCTUR DECIDES TO INFORM CUMMUNITY Sall 183. A CJTAP .K=CL SMT *NMI .K CUTAP - SKILL INCREASE DUE TO MEDICAL TREATMENT MURK - CHANGE IN LEVEL UF SKILL/AMOUNT OF MEDICAL CLSMT IKEATMENT WORK . LEVEL OF NORSE MEDICAL TREATMENT 184. A NLSK.K=NLS+LJIAP.K - NURSE'S LEVEL UF SKILLS NLSK - NURSE'S SKILL LEVEL DJTAP - SKILL INCREASE DUE TO MEDICAL TREATMENT

WUKK

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PAGE 1d A MUDEL OF A HEALTH FEAM 4/24/73 NEFF.K=NLSK.K+TAUHL(Tinn, NNUKK.K, J, 1.2, J.1)+ 185. A TABLEINFF, NIKST.K.U.I.U.21 NFF=1/1/.E5/.7C/.55/.40 185.2 n T TNm=1/1/1/1/1/1/J.yo/u.gu/u.gu/u.gu/u.gu/u.gb 185.3. T NEFE - NURSE EFFEUTIVENESS - NUKSE'S LEVEL UF SKILLS ALSK. - NURSE EFFECTIVENESS VS WURK LUAD TNW - LEVEL OF WORK PERFORMED BY NURSE NWORK - NURSE EFFECTIVENESS VS FAUSTRATION NEF NERST - NURSE FRUSIKATILN NKCC.K=NKEC.J+(DT){KNKUL.JK}(I-NKUC.J) 180. L NKUC - NURSE'S LEVEL UF KNUR. UF COMMUNITY KNKCC - KATE OF CHANGE OF NOKSE'S KNOWLEDGE OF CUMMUNITY RNKCC.KL=(SLF.K+UGNI.K+FKUC.K+UTCF.K+RVN.K+ROCTN-187. R NKUC.KI/TTKN TTKN=52 187.1. C - RATE OF CHANGE OF NURSE'S KNOWLEDGE OF RNKCC CUMMUNITY SLF - STAFF ESTIMATION OF PERFURMANCE OF FHW CGNI - CKIENTATION OF GOALS OF NURSE - FHm KNUMLEDGE OF CUMMUNITY FKOC CTCF - LESIKE TU LUMMUNICATE BY FHW RVN - RECUGNIZED VALUE OF NURSE RECTN - KATE OF COMMUNICATION/WEEK TO NURSE NKDC - NURSE'S LEVEL OF KNUW. OF COMMUNITY TTKN - TIME TO CHANGE NURSE'S KNOWLEDGE OF CUMMUNITY DMNEF.K=NEFF.K*NWURK.K 188. A DMNEF - LUCTUR'S MEASURE OF NURSE EFFECTIVENESS - NURSE EFFECTIVENESS NEFF NWORK - LEVEL OF WORK PERFORMED BY NURSE CPCN.K=SMCQTH(UMNEF.K,UMEFF) 189. A DPCN - COCTOR'S PERCEPTION OF NURSE (PRAISE **UELIVEREDI** - CCCTOR'S MEASURE OF NURSE EFFECTIVENESS DNEFF - DELAY IN PERCEIVING VALUE PRVN.K=SMCOTH(RVN.K.DNK) 190, A PRVN - PERCEIVED RECUGNIZED VALUE OF NURSE RVN - RECOGNIZED VALUE OF NURSE DNR - DELAY IN PERCEPTION OF RECOGNIZED VALUE CPGP.K=DPNTC.K+RVU.K+0.2 191. A - COMMUNITY PERCEPTION OF PRAISE CPUP - DOCTOR'S PRAISE OF NURSE TO COMMUNITY DPNTC RVD - RECOGNIZED VALUE OF DUCTOR DINR.K=STEP(AMPL,STTM) 192. A - CESIRE TO INCREASE NURSE RESPONSIBILITY DINR

- STRENGTH OF DESIRE TO INCREASE

- TIME AT WHICH INCREASE BEGINS

RESPUNSIBILITY

AMPL

MTTZ

A MUDEL UF A HEALTH TEAM 4/24/73 PAGE 19 193. A CPAMT.K=GCP.K+DPNMT.K CPNHT - COMMUNITY PERCEPTION OF NURSE MEDICAL **IREATMENT** - GCALS OF PUPULATION GOP DPNMT - DELAYED PERCEPTION OF NURSE LEVEL OF MEDICAL TREATMENT 194. A CPNMT.K=SMUUTH(NMT.K.DPMT) DPNMT - DELAYED PERCEPTION OF NORSE LEVEL OF MEDICAL IREATMENT - LEVEL UF NURSE MEDICAL TREATMENT NMT 195. A CGN1.K=UGN.K CGN1 - CRIENTATION OF GUALS OF NURSE - CRIENTATIUN OF GUALS OF NURSE OGN 196. L CGN.K=UGN.J+(CT)(KUGN.JK) DGN - UKIENTATIUN UF GUALS UF NURSE - RATE OF CHANGE OF NURSE GOAL URIENTATION RCGN.KL=(NKUC.K)(1-OGN.K)(TU.K)(CGN.K)/ADJ3J - KATE OF CHANGE OF NURSE GOAL ORIENTATION ROGN - NURSE'S LEVEL UF KNOW. OF COMMUNITY NKUC - CRIENTALIUN OF GOALS OF NURSE CGN - TEAM GUAL URIENTATION Til ADJ30 - TIME REGULKED TO CHANGE GUALS CRVN.KL=(CGN.K*NEFF.K*GUP.K+CAMAN.K*GUP.K-RVN.K)/2 198. R - RATE OF CHANGE OF RECUGNIZED VALUE OF NURSE CRVN - CRIENTATION OF GOALS OF NURSE OGN - NURSE EFFECTIVENESS NEFF - GCALS OF PUPULATION GCP CAMAN - COMMUNITY AWARENESS OF MEDICAL ABILITY OF NUKSE - RELUGNIZED VALUE OF NURSE 199. L RVN-K=RVN-J+(ET)(CKVN-JK)(1-KVN-J)*RVN-J RVN - RECUBBLIZED VALUE OF NURSE - KATE OF CHANGE OF RECOGNIZED VALUE OF NURSE CRVN SCCNF.K=SCUNF.J+(UT)(KSCNF.JK)(1-SCONF.J) 200. L SCENT - LEVEL OF NUNSE'S SELF CONFIDENCE RSCNF - RATE UF CHANGE UF SELF-CONFICENCE RSCRF.KL=(1-NmCkK.K)(UPUN.K+(1-UMUKK.K)+PRVN.K)/(3# 201, R TIGSCI 201.1. C TTGSC=13 RSCNF - RATE UP CHANGE UF SELF-CONFIDENCE - LEVEL OF WORK PERFORMED BY NURSE NEURK - COCTOR'S PERCEPTION OF NURSE (PRAISE DPCN DELIVERED) DWORK - LEVEL OF WORK PERFORMED BY COCTOR - PERCEIVED RECOGNIZED VALUE OF NURSE PRVN TIGSC - TIME TO CHANGE SELF-CONFIDENCE (WEEKS)

PAGE 20 A MUDEL UF A HEALTH TEAM 4/24/73

NDTMD.K=SCUNF.K*NFRST.K 202, A

NDTMO - NURSE'S DESIRE TO TAKE UVER DUTIES SCENE - LEVEL OF NURSE'S SELF CONFIDENCE

NFRST - NUKSE FRUSTRATIUM

CAMAN.K=CAMAN.J+(UT)(CPUP.J+CPNMT.J)(1-CAMAN.J)* 203, L CAMAN.J/2

CAMAN - COMMUNITY AWARENESS OF MEDICAL ABILITY OF NURSE

CPUP - COMMUNITY PERCEPTION OF PRAISE

CPNMT - LUMMUNITY PERCEPTION OF NURSE MEDICAL TREATMENT

AMT.K=NMI.J+(DT)(INWL.JK)

204. L

NMT - LEVEL UF NURSE MEDICAL TREATMENT
INWL - INCREASE IN WORK LEVEL OF NURSE

INWL.KL=(ADTMC.K)(DPNIC.K+CAMAN.K)(PCPT)(1-DWGRK.K) 205. R

INML - INCREASE IN WORK LEVEL OF NURSE

NOTHO - NURSE'S DESIRE TO TAKE OVER DUTIES

DPNTC - DGCTOR'S PHAISE OF NURSE TO COMMUNITY

CAMAN - CUMMUNITY AWARENESS OF MEDICAL ABILITY OF NURSE

PCPT - PERCENT CHANGE IN PATIENT TREATMENT/WEEK

DWORK - LEVEL UF WORK PERFORMED BY DOCTOR

DDWK.K=((1-SCUNF.K)*PISD-CAMAN.K*PNEDW)*INWL.JK 206, A

DDWK - CHANGE IN DOCTUR'S WORKLOAD DUE TO NURSE

SCONF - LEVEL OF NURSE'S SELF CONFIDENCE

PTSD - FRACTION OF TIME SPENT BY DOCTOR DEVELOPING NURSE CONFIDENCE

CAMAN - COMMUNITY AWARENESS OF MEDICAL ABILITY OF NURSE

PNEDW - PERCENT NURSE WORK EQUIVALENT TO DECTOR'S

INWL - INCREASE IN MURK LEVEL OF NURSE

PAGE 21 A MUDEL OF A HEALTH TEAM 4/24/73

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CTCNaK=(SCCNFaK+UPUNaK-NFKSTaK)/2
                                                      207. A
FNEDb=0.75
                                                      207.1. C
ACJ30=52
                                                      207.2, C
FCCTN=0.1
                                                      207.3. C
CL SMT=0.2
                                                      207.4. C
SCCNF=J.3
                                                      207.5. N
                                                      207.6. N
AMT=0.1
                                                      207.7. C
CNEFF=4
DNR=6
                                                      207.8. C
NLS=0.7
                                                      207.9. C
           - NURSE'S DESIRE TO COMMUNICATE
    DICN
           - LEVEL OF NURSE'S SELF CONFIDENCE
    SCCNF
    DPLN
             DUCTOR'S PERCEPTION OF NURSE (PRAISE
                DELIVEREDI
    NERST
           - NURSE FRUSIRATIUN
           - PERCENT NURSE WURK EQUIVALENT TO DCCTOR'S
    PNEDW
           - TIME REQUIRED TO CHANGE GOALS
    ADJ30
           - RATE OF COMMUNICATION/WEEK TO NURSE
    RUCTN
           - CHANGE IN LEVEL OF SKILL/AMOUNT OF MEDICAL
    CLSMT
                TREATMENT WORK
    NMT
           - LEVEL OF NURSE MEDICAL TREATMENT
           - DELAY IN PERCEIVING VALUE
    DNEFF
    DNK
           - LELAY IN PERCEPTION OF RECOGNIZED VALUE
    NLS
           - NUKSE'S SKILL LEVEL
                                                      208, C
AMPL=0
                                                      208.1, C
STTM=80
                                                      208.2. C
CFMT=8
                                                      208.3. N
NWCRK=NWRKX
NERKX=0.8
                                                      208.4. C
UPDEL=4
                                                      208.5, C
CGN=CGNX
                                                      208.6. N
                                                      208.7. C
GGNX= .6
RVN=0.4
                                                      208.8. N
                                                      208.9, N
NKOC=NKOCX
           - STRENGTH OF DESIRE TO INCREASE
    AMPL
                KESPUNSIBILITY
           - TIME AT WHICH INCREASE BEGINS
    STIM
           - LEVEL OF WURK PERFORMED BY NURSE
    NEURK
           - INITIAL VALUE OF NURSE'S WURKLUAD
    NEKKX
           - CELAY TIME FOR PERCEPTION OF PATIENTS
    DPDEL
                ATTITUDE TO TREATMENT
           - LRIENTATION OF GOALS OF NURSE
    O GN
           - INITIAL VALUE OF NUKSE'S GOAL UKIENTATION
    CGNX
           - RECOGNIZED VALUE OF NURSE
    RVN
    NKOC
           - NURSE'S LEVEL OF KNUW. OF COMMUNITY
    NKOCX
           - INITIAL VALUE OF NURSE'S KNOWLEDGE OF
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CUMMUNITY

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PAGE 22 A MODEL OF A HEALTH TEAM 4/64/73 NKOCX=.4 209. C CAMAN=CMNX 239.1. N ShT1=0 204 . C. C CMNX=.2 264.3, C ACJSC=1 209.4, € PISD=U.3 209.5, (PCPT=U.2 239.6, C NPD=4 209.7, C KLT1= 4.05 209.8, C NKUCA - INITIAL VALUE OF NURSE'S KNOWLEDGE OF CUMMUNITY CAMAN - CUMMUNITY AWARENESS OF MEDICAL ABILITY OF NUKSE CMNX - INITIAL VALUE OF COMMUNITY AWARENESS OF NUKSE MED. DUTIES - C IF DUCTUR DECIDES TO INFORM COMMUNITY SHTI ADJSC - NURMALIZING FACTUR PISC - FRACTION OF TIME SPENT BY LOCTOR DEVELOPING NURSE CUNFIDENCE PCPT - PERCENT CHANGE IN PATIENT TREATMENT/WEEK NPD - NORMAL PERCEPTION DELAY MEASR .K=LCS .K +SUMND .K 210. A MEASR - LEVEL OF SERVICE CRITERION - LEVEL OF SERVICE LOS SCMNC - SERVICE DEMAND MECL.K=ECI.K+SOMNU.K 211. A MEDL - MEDICAL INEATMENT CRITERION - EFFECTIVE OPERATION OF COURSE OF TREATMENT EUT SOMNO - SERVICE DEMAND

| | HMEKE USED | EUT.N.79.8 LCA.A.11.2 ACI.A.111 | L5C,A,110 | 5LF, Ap. 109 | KCOCF • R• 123 | UKGP. A. 82 FORM. D. 197 | 24.4.52 24.4.52 | UAI U. A. 85 | EUI,No/99.d/EUI,A,do | PFKSI, A, 150 | ADPR6, A, 145 | PICBS, A, 165 CAMAK, L, 62/PUSI, A, 64/PICOP, A, 152 | FUEL, A, 155/AUMAW, A, 158/KAFR, R, 168/FF UAC, A, 170/NFUAC, A, 171 | UPUNTA 192 | LUS. A. 163 | | 505.4. 118 501.4. 79.6 | PINE A 91 | | CUMNU, A.63 | CUMNU, A, 63 | PUSI.A.64/FLIK.K.129/PTCOP.A.152 | uJTAP, A, Lo.3 | LAMAN.N.209.1 | VAL 51, A, 30.2 | Laman, L, 203 | (14 MAN. L. 203 | | LSMSI-L-159 | CASTA No. 7 d 7 | DRUP, A, BZ/UATU, A, B3/HDATC, K, B5/RDKOL, R, 9U/VD.A,94 | UATC.N.106.5 | A,N,79.6/EUT,4,86 Umunk,L,73/CmUm,K,161 |
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